COLOMBO MUSEUM

GUIDE TO THE COLLECTIONS

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COLOMBO MUSEUM.

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PREFACE.

THE first Guide to the Colombo Museum for the use of visitors was compiled by Mr. Amyrald Haly in 1886; a second, abridged edition of it was printed in 1895.

The present issue may be regarded as an enlarged third edition having the additional advantage of illustrations.

Most of the principal objects will be found mentioned in the text. One rather important omission may be noted here. Among the examples of Tamil jewellery referred to on page 17, attention should have been directed to the "Thali," the marriage emblem of the Tamil race, which is worn round the neck mounted upon a more or less elaborate necklace.

The collection of rocks and minerals has been entirely re-arranged and greatly augmented by the Director of the Mineral Survey, Mr. A. K. Coomaraswamy, B.Sc., who has kindly written the account of the rocks and minerals of Ceylon for this Guide (see page 50).

In the compilation of the rest of the Guide I have had the assistance of the Museum staff, more particularly Mr. Gerard A. Joseph, Secretary and Librarian; Mr. H. M. Gunasekara, Assistant Librarian; and Mr. H. F. Fernando, Taxidermist.

ARTHUR WILLEY,
Director, Colombo Museum.

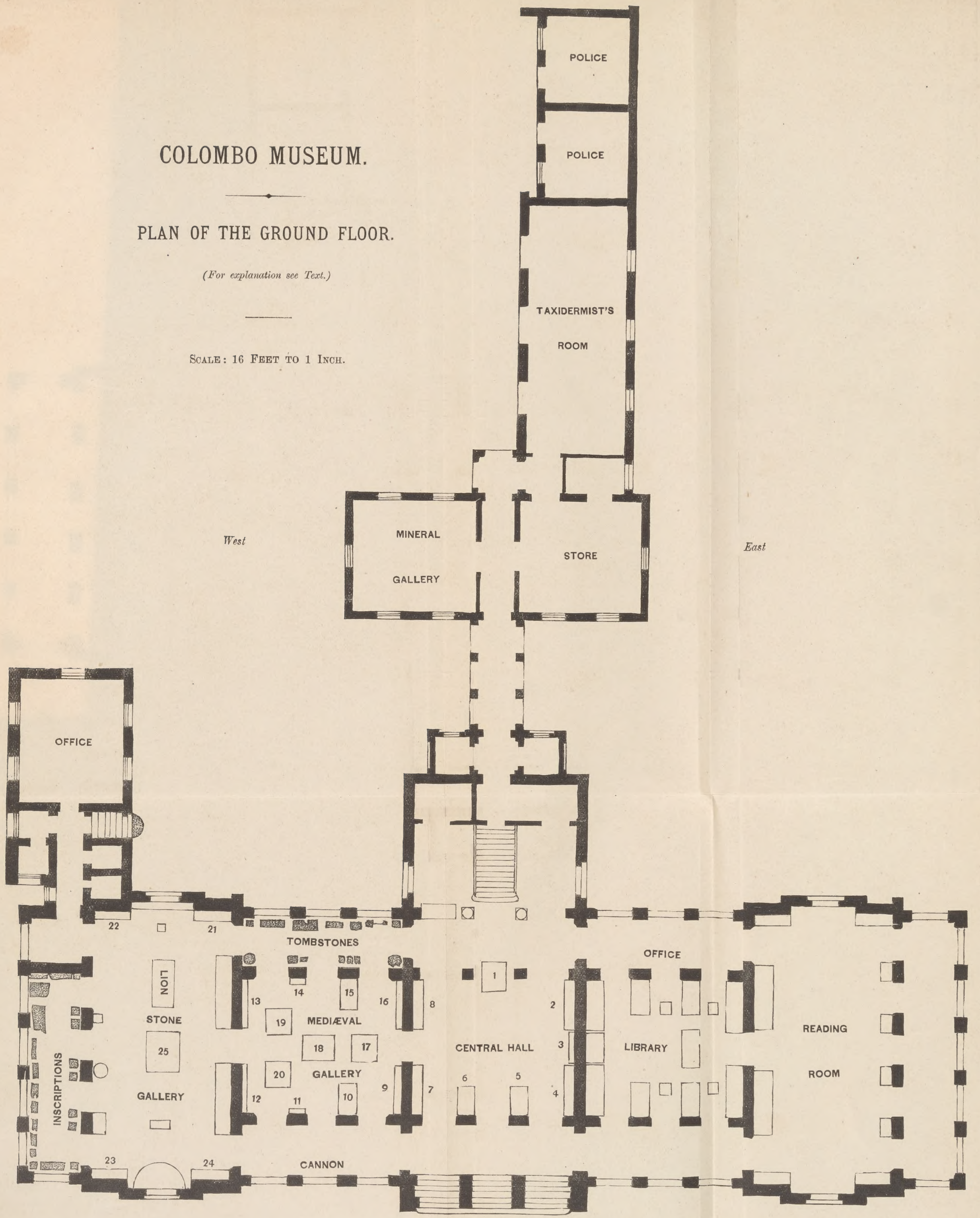
February 9, 1905.

COLOMBO MUSEUM.

PLAN OF THE GROUND FLOOR.

(For explanation see Text.)

SCALE: 16 FEET TO 1 INCH.

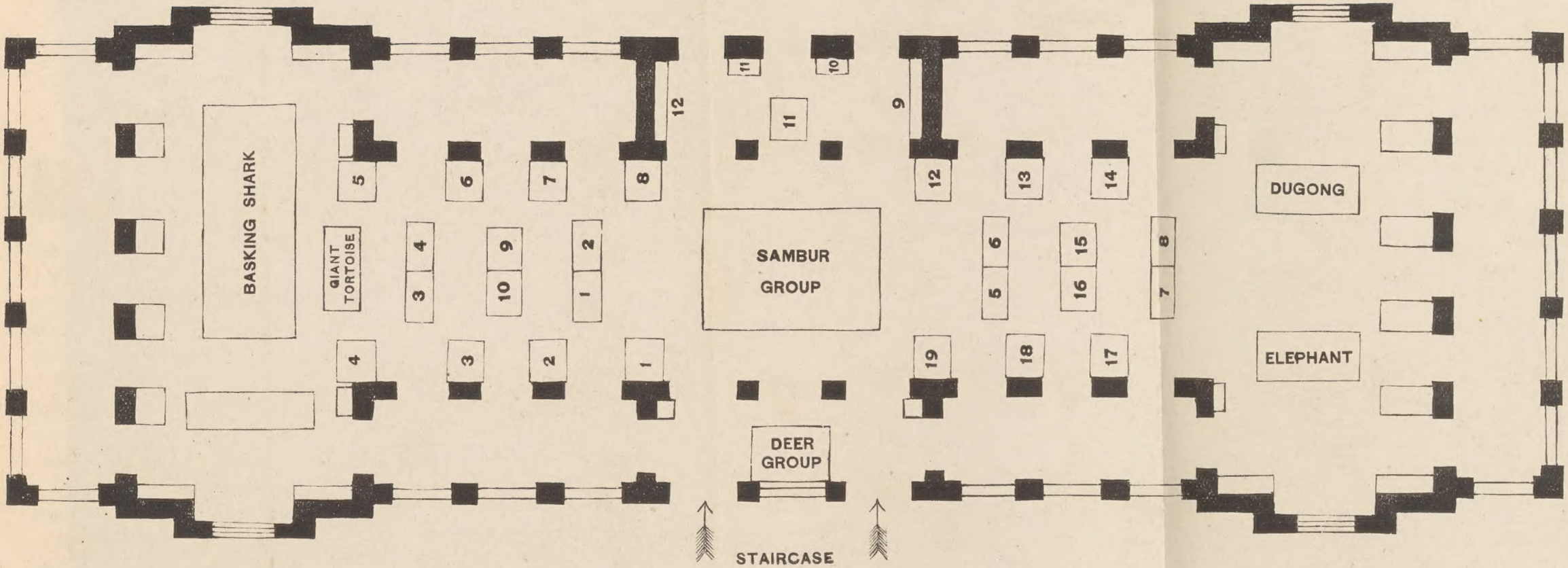


COLOMBO MUSEUM.

PLAN OF THE UPPER FLOOR.

(For explanation see Text.)

SCALE: 16 FEET TO 1 INCH.



A GUIDE TO THE

COLLECTIONS IN

THE COLOMBO MUSEUM.

INTRODUCTION.

THE collections of objects of antique, local, and general interest which are exhibited in the Colombo Museum are intended to illustrate solely the products of human ingenuity and cultivation, and the forms of nature as manifested in the Island of Ceylon and its dependencies. With few exceptions, which are specially noted where they occur, nothing is shown in the galleries which has not been found in the country or in the surrounding seas.

Owing to considerations of space on the ground floor, the various Buddhistical, Ethnographical, and Archæological exhibits are not arranged in such a strictly systematic manner as could be desired.

The Zoological collections occupy the upper floor of the Museum. The Mineral Gallery is situated at the back of the main building.

If reference be made to the ground plan of the Museum it will be seen that the rooms to the right of the entrance hall are assigned to the Library and Reading Room. The Library contains an exhaustive assemblage of books bearing directly or indirectly upon the religion, agriculture, archæology, and natural history of Ceylon. There is also a valuable collection of native literature in the form of **Ola Manuscripts**, relating in one form or another chiefly to

the Buddhist Scriptures. These documents are written in Sinhalese characters by hand with a pointed iron *stylus*, upon properly prepared slips of palm-leaves called "ola," and are composed either in Sanskrit, in Pali, or in Elu, the pure Sinhalese language.

The ola leaves which are employed for the transcription of the Sinhalese texts are made from the fan-shaped fronds of the Talipot Palm (*Corypha umbraculifera*), which grows principally in the Kandyan Districts; those adapted for Tamil usage by school children and others are commonly made from the similarly shaped leaves of the Palmyra Palm (*Borassus flabelliformis*), which is especially abundant in the northern parts of the Island. The Palmyra Olas are narrower, thicker, and less pliable than the Talipot Olas.

The manuscripts are often consulted by Buddhist priests and other readers who frequent the Library, and may be inspected, if desired, on application being made to the Librarian.

CENTRAL HALL.

The first case to meet the eye of the visitor entering the Museum is that which is placed under the archway before the main staircase. It affords a characteristic display of images of **Gautama Buddha.** These figures are executed in brass, bronze, wood, and ivory, and they represent the Founder of Buddhism (who lived about the fifth century B.C.) in three principal attitudes—sedent, erect, and recumbent. The head is generally surmounted by a five-rayed emblem called "sirispota," which symbolizes the sacred flame.

On the top of the case there is a large wooden **dagaba** or relic case. The ancient dagabas at Anuradhapura and elsewhere are immense structures supposed to have been erected over various relics of Buddha and his disciples. Representations of the dagaba on a small scale, in wood, metal, and ivory, are commonly used as emblems or as reliquaries, just as the small effigies of Buddha are portable copies of the gigantic statues which are scattered about the country.

The lower portion of this case contains, on the front side, a selection of **Matara Jewellery,** dating, at least with regard to the designs, from the Dutch period (1655–1796 A.D.). The collection comprises necklaces, brooches, hair ornaments, &c. Most of the pieces are *parures* of the so-called Matara diamonds (zircons), white sapphires, and black tourmalines, in a silver or silver-gilt setting, manufactured by native jewellers at Matara, Galle, and Colombo.

TALIPOT PALM.

[*To face page 2.*

On the other side of this table case there is a miscellaneous display of Tamil silver waist-bands, charms, a Mudaliyar's dress sword, &c.

Products of the Palmyra Palm.—This palm grows in the low-lying dry parts of the Island. There are extensive native plantations in the Northern Province, especially in the Jaffna Peninsula and the outlying islands. It shares with the Cocoanut Palm and the Date Palm the distinction of providing more serviceable commodities for the use of man than any other single species in the vegetable kingdom. As already mentioned, the leaves are employed in the manufacture of olas; they are also used for fences, thatching, fans, mats, hats, baskets, water balers, and umbrellas.

The fruits ripen in the months of August and September, when they fall to the ground, and are sometimes eaten raw, but more generally roasted [W. Ferguson]. They vary in qualities of colour, smell, taste, and shape. From the fleshy part of the fruit a sweet farinaceous jelly is prepared, called Palmyra Pulp or "punatoo." The nuts are sown under loose sandy soil, and the very young subterranean saplings, after being cleaned and dried, yield the Palmyra Flour.

Palmyra Toddy is prepared from the sap of the flower buds, which are tapped by the toddy drawers during the months of November and December, the rainy season of the Northern Province.

Sugar or "jaggery" is prepared from sweet toddy, *i.e.*, from the palm juice which has been prevented from undergoing fermentation by coating the inside of the toddy receiver with lime or "chunam."

On the top of the case there are models of a Jaffna bungalow with **Palmyra Roofing**, a shelter for watchers in the paddy fields, a manger, and a platform for grain.

The Palmyra Palm is dicœcious, *i.e.*, the male and female flowers are on different trees. In a plantation half the trees will be male and half female. The female tree yields superior timber and a greater quantity of toddy than the male tree.

The model of the Palmyra Palm and other articles in this case were presented by Sir W. C. Twynam, K.C.M.G.

Commercial Products.—Until 1880 coffee was the staple export since the British occupation. During the Dutch administration the Government held a monopoly of the cultivation of cinnamon, but this industry is fast disappearing under competition with other countries. The Cinnamon Gardens of Colombo are noted for the extreme rarity of the cinnamon shrubs, whole plantations

of which have been removed during the past ten years to make room for building purposes.

From 1880 to 1886 Ceylon passed through a financial crisis in consequence of the failure of the coffee trees, which were destroyed by a fungoid disease caused by an organism named *Hemileia vastatrix*, for which no cure could be found. During this time cinchona and tea planting came into being, and Ceylon is now chiefly famous throughout the world for the excellence of its tea.

Other products of importance are cacao, cinchona, cardamoms, and rubber.

More than sixty varieties of rice or "paddy" are grown in the Island, all of which, with one exception (the variety called "el-vi"), require more or less continual irrigation.

Another grain of great importance to the poorer natives is that which is called millet or "kurakkan" (*Eleusine coracana*). This is grown on waste lands called "chena," a corruption of the Sinhalese word "hena," meaning ground prepared for cultivation at intervals of several years by the cutting and burning of jungle.

The arecanut is the fruit of the Areca Palm, the tall slender stems of which afford a pleasing contrast with the unending groves of cocoanut palms. It is used for chewing with the betel leaf, and also has some medicinal value.

Native tobacco is extensively cultivated in various parts of the Island.

On the top of the case are specimens of the gum of the cashew or caju tree (*Anacardium occidentale*), a common tree yielding an edible nut, but not endemic, having, it is thought, been introduced from Brazil by the Portuguese; and the resin of the tree called "hal" in Sinhalese (*Vateria acuminata*).

Products of the Cocoanut Palm.—The objects exhibited in this case have on the whole a familiar homely appearance, and bear eloquent testimony to the world-wide importance of the tree upon which, in the first instance, the wealth of the Island largely depends. Almost every part of the tree subserves some useful purpose, and its general commercial value far exceeds that of the Palmyra Palm. It begins to bear fruit at about the tenth year, and a single tree may yield about seventy nuts annually. It is monœcious, *i.e.*, male and female flowers are on the same tree, so that every tree in a plantation will be fertile.

Most compounds of bungalows in Colombo are planted with cocoanut palms, which can only be cut down by tenants upon payment of ten rupees for each tree.

The husk of the fruit yields coir fibre, the shell can be used for drinking vessels, bowls often handsomely carved, spoons, charcoal,

&c. The kernel is largely used in cookery, being grated fine by an instrument called a cocoanut scraper, after which milk can be expressed from it; when dried in the sun it is known as copra, from which oil is extracted, the residue being used as cattle food. The leaves are plaited to form cadjans for thatching roofs, also baskets; and the trunk yields good timber. The young fruit, called "kurumba," furnishes food and drink. The sap of the unopened flower supplies toddy, arrack, and jaggery.

The dried frond of the palm is twisted into a bundle and used as a torch. These torches are often employed for purposes of illumination on festival occasions, being known as "chulu" lights, a corruption of the Sinhalese word "huluatta." Torches are also furnished by the spathes of the flowers, called "kolapuwa." The midribs of the leaflets are tied into bundles and form excellent besoms, called "ekel" brooms, a corruption of the Tamil word "irekú," meaning the midrib of a palm leaf.

The preparation of coir fibre is an important industry in the Western and Southern Provinces. The following account taken from Dr. Shortt's Monograph of the Cocoanut Palm applies equally to the methods in use in Ceylon as to the districts in India, to which he refers more particularly :—

"The husks, removed from the nuts, are collected and thrown into pits containing water to soak, and kept there till decomposition sets in." [Along the railway from Colombo to Galle many portions of the backwaters and estuaries are fenced in for this purpose.] "The coir, when taken out of the pit, is beaten with stout sticks to break up the adhesion and free the fibre from impurities. Next it is hand-rubbed" ..... and "subsequently rolled into loose pads of about a finger's thickness preparatory to being twisted into yarn by the palms of the hands."

In the bottom shelf is shown the apparatus employed in the distillation of arrack, and on the top of the case there is a similar apparatus in native pottery.

Fisheries and Transport.—Many of the models in this case were made for the Chicago Exhibition of 1893.

On the top shelf are shown models of a bullock cart, a Kandyan grain store, fish traps, a rattan bridge, and a "chekku" or oil mill for expressing oil from copra and for the manufacture of gingelly oil. The "chekku" consists of a huge mortar sunk deeply into the ground and made of stone in the Western Province, or of tamarind wood in the North-Central Province; in this a heavy pestle revolves, being worked by a horizontal lever driven round by a bull or a pair of bulls. A man usually sits on the lever to increase the weight of the pestle.

On the second shelf there are more models of carts and hackeries, a mud house, and a large native sailing craft called a "dhoney."

On the third shelf there are models of "kattumarams," a Negombo canal "padda" boat, and a boat used in the **Pearl Fishery** with representations of the crew and divers. The white man in the stern holding a suspicious looking bottle in a compromising attitude is the doctor preparing a dose of medicine.

On the last shelf there are models of outrigger boats, fishing and passenger boats, a double canoe, and a river raft. There is also a set of chank shells (*Turbinella pyrum*) and several rings cut from this shell. The chank fishery at Jaffna has been an important source of revenue. During some years as many as three millions of these shells have been exported annually to Calcutta, where they are used for the manufacture of temple conches and of **chank jewellery** which is destroyed at funerals.

Other noteworthy exhibits on this shelf are a pearl diver's coir basket which has been actually in use, presented by J. Hornell, Esq., Marine Biologist, and a pearl diver's sinking stone from the Pearl Fishery of 1904, presented by the Hon. Mr. E. F. im Thurn, C.B., C.M.G., then Lieutenant-Governor.

The chank shells and rings were presented by Sir William Twynam.

Objects from the Maldive Islands.—The Maldive Islands are an archipelago of coral atolls inhabited by a Mohammedan population ruled by a Sultan of ancient lineage, who pays annual tribute to the Ceylon Government. The Maldivians are an artistic people, the commonest articles in daily use being elegantly shaped, carved, and lacquered. They make use of European glassware and earthenware, but protect their dishes and plates and glasses "in boxes or cupholders of the most elegant designs and elaborate carving and colouring. Their boats are also elaborately decorated when new. On State festivals the capital, Malé, presents a most gay appearance, the roofs of the houses being covered with richly coloured cloths, and all the streets profusely decorated with bunting and curious models of modern steam vessels and little kiosks furnished with chess tables, the whole being brilliantly illuminated at night, when the Sultan, amidst a profusion of fireworks, and preceded by his band, visits the numerous mosques" [A. Haly].

The Maldivian sea-going sailing vessels, called buggalows, are often to be seen in Colombo Harbour, and the view from the end of the breakwater of one of these boats entering the harbour during the north-east monsoon is highly picturesque.

MALDIVIAN LACE-MAKING PILLOW AND LACQUERED STAND.

(Total height, 1 foot 2 inches.)

[*To face page* 6.

RICE MEASURE. PLATE BOX. BOTTLE BOX.

(*Diameter*, 11 *inches.*)

MEDICINE BOX. FLOWER BOX. INK BOX.

(*Height*, 8½ *inches.*)

MALDIVIAN LACQUERED BOXES.

To face page 7.]

The model of a ship with a mat sail in Case VI. represents the kind of boat used for traffic between the numerous islands of the Maldive group. The models in Case VIII. were presented by the Sultan of the Maldives, and do not include a copy of the typical Maldivian buggalow, which is built on characteristic lines unlike anything shown in these cases. In Case VIII. there are two finely lacquered drums, spears, and musical instruments. In Case VI. the **chess boards, spinning tops,** stands for lace pillows, Nautilus shell spoons, weighing scales, and **nautical instruments** are among the more noteworthy objects exhibited.

The lac employed in decorating the fancy boxes, dish covers, drums, sticks, spears, and stands is imported into the Maldives from India. The patterns into which it is worked, as well as the designs followed in wood and stone carving (see below, Maldivian Tombstones), appear to be exclusively Maldivian.

Many of the objects in Case VI. were presented by H. C. P. Bell, Esq., C.C.S., Archæological Commissioner. The rest formed part of a collection of Maldivian articles exhibited at the World's Columbian Exposition at Chicago in 1893, and were presented by Sultan Ibrahim Noorudin Iskander, Sultan of the Maldives from 1882 to 1893.

Masks and Musical Instruments.—Masks are used in plays, masquerades, and devil-dancing. Their invention is attributed to the god of curiosities. Those representing various diseases are said to be employed by devil-dancers to exercise the devils who occasion the sickness. Their construction appears to be based upon the principle of eradicating disease from the system by the homœopathic method of counterfeit presentments.

In spite of their grotesque character and of the fact that they can be made to order at the present day, these masks possess a profound interest as affording a clue to the origin of the ancient masks used in the Greek plays. The Oriental masks of the demons have been regarded as the prototypes of the Birds of Aristophanes, the Giants of Pollux, and the frightful forms of Lucian [Upham]. "The mask is the type of the Metempsychosis, the great pivot of Oriental doctrine, exhibiting to the spectator, scenically, the changes and forms which in different stages of mundane existence attach to the vital principle."..... "Had masks originated with the Greeks, it is fair to conclude that, instead of such frightful specimens which abound in every museum, they would have given the human form as they have beautifully embodied it in their painting and sculpture; hence the physiognomical character of the masks may be said to decide their origin and locality to the East" [Upham].

The Maha Kóla Sanni Yaka, or Yaksha, represented by the composite mask in the centre of the case and again over the top of Case VIII.,* is the great Demon of Fatal Diseases, all of which are attributed directly to devilish derangements of the three humours, wind, phlegm, and bile.

The Gopolu, or Gopola Yaka, is the Demon of Cattle, and all cattle sickness is supposed to proceed from him. He is represented with horns and tusks and a garment of leaves.

The Gara, or Garra Yaka, is the demon who possesses newly-built houses, and before a house can be finally occupied a ceremony called Gara Yaka Maduwa is generally performed. This ceremony is presumably equivalent to the European house-warming.

Súniyama or Húniyama is the art of sorcery, bewitching by spells and incantations. The word is sometimes anglicized into Hooniyan, this being the name given to evils inflicted by a man upon his neighbour or enemy by the agency of charms. In Hooniyan charms a small image of wax or wood is made to represent the person whose death or injury is desired. "A few hairs of his head, some chippings of his finger nails, and a thread or two from a cloth worn by him, and sometimes a handful of sand from a place on which he has left his footprint, are required." The image is then submitted to a ceremony called Jíwama ("endowing with life") performed by a Kaṭṭáḍiya or sorcerer, who recites mystical words over it. Nails made of a composition of five different metals—gold, silver, copper, tin, and lead—are driven into the image through the joints, the heart, and the head, and the name of the victim is marked on the image, which is then buried in the ground under a stile or at some other spot where the victim is likely to pass over it. The passing over, or Panna-wana-wa, is essential to the success of the charm. †

This Hooniyan charm, or **Sunniyan Yaka,** as the specimen is labelled in the case, is of particular interest on account of its world-wide application in the practice of witchcraft.

On the top of the case, besides more demon masks, there are large masks called the King and the Queen. These are used in the native masquerades called Kólama.

The lower portion of the case contains a collection of **musical instruments.** The drums are of various kinds, the more characteristic being the flat drum or timbrel called Rabána; the bobbin-shaped drum called Uḍikkiya or Udakiya; Tammeṭṭama,

* This Kóla Sanni Yaka was presented by Mr. Justice H. L. Wendt.

† The account given above of the Hooniyan charm is taken from an article "On Demonology and Witchcraft in Ceylon," by Dandris de Silva Gooneratne, Mudaliyar, in the Journ. Ceylon R. Asiat. Soc., vol. IV., 1865–6, pp. 1–117.

two drums fastened together as kettle drums ; Demaḷa-beṛé, Tamil tom-tom ; Yak-beṛé, demon tom-tom. The Rabána is beaten by women seated in a group round it on occasions of family rejoicing.

Among the stringed instruments are to be noted the Wéṇáwa or Víṇá, the Indian lute, an instrument with a good twang, the resonator consisting of a cocoanut shell with a skin stretched across it. The Bandarinha and Viola, presented by H. Holsinger, Esq., are used by the Mechanics* of Ceylon to accompany their Lusitanian dances.

There are also a couple of marionettes, employed in a form of entertainment much in vogue among the Sinhalese.

Other exhibits in the Central Hall include two stands of **Kandyan spears** with lacquered shafts, together with Kandyan blunderbusses and processional fans.

On the top of Case VIII. there is an interesting relic of the early conflicts between the British and the Kandyans in the form of a British drum said to have been captured by the latter.

On a small stand at the foot of the staircase there are some antique cannon balls, probably of Portuguese origin, which were unearthed at Medamahanuwara, near Kandy, a place which is noted for the existence of a cave in which the last King of Kandy took refuge after his flight from the British, and where he was captured in 1815.

MEDIÆVAL ROOM.

CASE IX.

Ivory Carvings.—This case contains a varied and valuable collection of objects made principally of ivory. The specimens which are worthy of attention include fan handles in ivory and ebony, combs, panels, dagabas, &c.

The large boxes are carved and shaped after Dutch designs.

The art of making the **compressible scent sprinklers** is said to be a secret confined to one family of ivory workers in the Kegalla District. The little figures of the last King of Kandy, two of his Ministers or Adigars, and the Chief Priest are said to be contemporary portraits. Sri Wikrama Raja Sinha was the last king of the Suluwansa or Lower Dynasty. He came to the throne of Kandy in 1798 and reigned until 1815, when he was deposed chiefly on account of his cruelty. The ivory statuettes of **Ehelapola** and his wife are also of considerable interest. Ehelapola became First Adigar of the King of Kandy in 1812. He

* The Mechanics of Ceylon are a class of artisans, shoemakers, tailors, blacksmiths, craftsmen of Portuguese descent, speaking a lingo of their own, Portuguese with an admixture of Tamil and Sinhalese. *Cf.* Mr. C. M. Fernando's article on the Music of Ceylon in Journ. Ceylon R. Asiat. Soc., vol. XIII., 1893–1894, pp. 183–189.

was also Dissave of Sabaragamuwa. Having disobeyed an order to proceed to Kandy his family was imprisoned by order of the king, and subsequently his children were beheaded in front of the Maha Vishnu Dewale at Kandy and his wife was drowned in the tank at Bogambra, near Kandy. This incident is known as the Ehelapola Tragedy, and constitutes a favourite theme on the modern Sinhalese stage.

On the lowest shelf of this case there are some more ivory statuettes of Buddha, ivory flutes, and a richly carved rattle mounted on a lacquered stick.

There is also a handsome ivory Udakiya (without skins) lent by P. E. Pieris, Esq., C.C.S., and an antique ivory cigar mouthpiece with receptacle for an extra cigar, presented by Mr. E. R. Gooneratne, Gate Mudaliyar.

The quaintly-shaped and lacquered pill boxes and the ola book covers with the signs of the zodiac deserve notice.

The ivory dagabas are reliquaries or karanduwas, the dome being screwed upon the base so that it can be removed and a cavity disclosed in which any small object of veneration or votive offering can be deposited.

CASE X.

Besides the numerous examples of Kandyan embossed metal work which are exhibited in this case, the most striking object is a silver model of the shrine containing the Dalada or Tooth of Buddha, the reputed original of which is preserved in the Dalada Maligawa at Kandy. This famous **Tooth Relic** has played an important part in the political history of Ceylon. It is esteemed by Buddhists as the palladium of the country and symbolizes the inviolability of the Buddhist religion. It is related that the sacred relic was originally rescued by the sage Khema from the great teacher's funeral pyre at Kusinagara and given by him to Brahmadatta, King of Kalinga, about 2,500 years ago. It was eventually brought to Ceylon from Southern India by a Brahman Princess of Kalinga, concealed in the folds of her hair, about the years 310-313 A.D., during the reign of Sri Megahavarna at Anuradhapura, where it was wont to be publicly exposed on sacred days with gorgeous ceremonies. When the relic was first brought to Ceylon its adventures were recorded in a work called the Dhatuwansa or Chronicle of the Tooth, written in Elu, the classical language of the Sinhalese. The tooth is said to represent the left upper canine or eye-tooth. The legend runs that after all attempts which have been made to destroy the sacred emblem, it has reappeared resting upon a lotus flower, where it now reposes. Parakrama Bahu I., surnamed the Great, built a temple for it at

TEMPLE OF THE TOOTH, KANDY.

[*To face page* 10.

MODEL OF THE TOOTH RELIC.

To face page 11].

Pulastipura, the modern Polonnaruwa, between the years 1190 and 1195. About the year 1246 A.D. Vijaya Bahu III. enshrined it at Dambadeniya, whence some forty years later Bhuvaneka Bahu I. removed it to Yapahu. Thence it followed the fortunes of the Suluwansa Dynasty to successive capitals, Kurunegala, Gampola, and Kotte near Colombo.

In the year 1560 A.D. it is said to have been captured by the Portuguese and taken to Goa, where it was pounded in a mortar and consumed in a brazier, but Phœnix-like it rose again from its ashes and is now at Kandy.*

The vicissitudes of the Tooth Relic are matters of speculation and controversy, but its political importance as a national palladium during the dynastic periods seems to be beyond doubt.

The model here shown was exhibited at Chicago in 1893.

The same shelf contains a handsome display of silverware, amongst which may be specially noted the large silver dagaba exhibited at the Colonial and Indian Exhibition of 1886; two large boxes of beaten silver embossed with deities and scroll work; a large spherical silver box with intricate design in high relief; an elegant silver chatty; a silver chalice for sandalwood; and a silver scent diffuser of the kind used for sprinkling guests at wedding ceremonies and for spraying coffins in funeral processions. There is also a finely worked brass dagaba. The leaf-shaped tassels hanging round the top of the dagabas represent the leaves of the sacred Bo-tree (*Ficus religiosa*).

On the next shelf below a large series of brass bowls called "chembu" is shown. Some of them are further adorned by the inlaying of alternating strips of beaten silver and copper.

The bottom shelf contains further examples of **Kandyan brasswork,** especially betel trays and rice tables, prominent among them being an antique Kandyan rice table presented by A. K. Coomaraswamy, Esq., Director of the Mineralogical Survey of Ceylon.

The upper shelves of the case contain on one side a set of embossed silver and brass plates, and a pair of carved silver ola covers with ola manuscript descriptive of one of the Játakâs or Births of Buddha.

On the other side there are some examples of wood carving, a carved calamander cocoanut scraper from Panadure, between Colombo and Galle; sweetmeat moulds or jaggery boards; game boards called "chonka boards," in which the seeds of the

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* *Cf.* Memoir on the History of the Tooth Relic of Ceylon, by J. Gerson da Cunha, 1875.

"olinda" (*Abrus precatorius*) or any other suitable seeds or shells are placed in two depressions at the ends, and the players have to make the circuit of the board from pit to pit along the sides without occupying the same hole at one time. The player who gets the seeds home first wins.

On the end-wall of the case there are some carved wooden sweetmeat pats. Hanging from the top of the case down the middle is a richly embroidered silk cloth said to have been worn by the wife of Molligoda, the Second Adigar of the last King of Kandy.

CASES XI. AND XIV.

Embroidered Cloths.—The narrow wall case contains examples of dress worn by the old aristocracy of the low country.

In the centre is a hat of peculiar shape, somewhat boat-shaped, called "Jagalatta Toppiya," used by Rajapakse, Chief Mudaliyar of Mahabadde, 1701 A.D.

There is also a Mudaliyar's dress sword and a sword with hilt and scabbard of richly carved tortoise-shell dating from the end of the 18th century, lent by Tudor Rajapakse, Esq.

On the top shelf there are some Dutch swords.

In the case corresponding to this on the opposite side of the room (Case XIV.) some further examples of **woven cloths** are shown, including a handsome old embroidered Kandyan betel bag, which was formerly carried slung at the side from the shoulder. There are also some gold embroidered Chetty costumes.

CASE XII.

This case contains an assortment of antique objects in brass and bronze, among the more interesting of which are three Sinhalese water clocks; cocoanut oil lamps; elephant bells; karanduwas (dagabas); Pattini bangles, hollow armlets and anklets with a slot along one side and pellets inside, used in dances on festival occasions such as peraheras, in honour of **Pattini Deviyo,** the goddess of chastity; epaulettes, also worn by dancers.

The **Sinhalese water clock** is a clepsydra, consisting of a copper bowl, of larger and smaller sizes, with a small pinhole in the bottom and with or without silver datum marks let in at the sides. The bowl is set floating in a clay water chatty, the water gradually entering through the pinhole aperture until a datum level is reached, and eventually the bowl sinks. In the larger of the clocks shown with graduations the water reaches the level of the highest datum mark in exactly forty-eight minutes. The Sinhalese hour or "peya" consists of twenty-four minutes,

BUDDHIST PROCESSION IN KANDY: THE ANNUAL PERAHERA.

[*To face page* 12.

and the day and night are divided into thirty "pe̤yas" each. The water clock is called "pe̤-te̤tiya."*

On the top of the case there are some interesting examples of old Sinhalese domestic wood carving, an art which has almost if not entirely fallen into disuse. The series includes carved cocoanut ladles and spoons with more or less ornate wooden handles, carved wooden **spoon racks**, and a cocoanut scraper.

CASE XIII.

This case contains a large series of boxes and implements employed in the services of the arecanut and tobacco. The arecanut is the principal ingredient in that form of indulgence known as betel chewing. A fragment of a nut with other spices is wrapped up in a betel (pepper) leaf and eaten. Then the finger is dipped in slaked lime called chunam and placed upon the back of the tongue, or sometimes a spoon or spatula may be employed for this purpose. The lime is kept in metal boxes, called **chunam boxes**, which are elegantly shaped, embossed, and inlaid. The box is suspended by a chain, at the end of which, when complete, are carried a small silver or brass earpick, a toothpick, and a spatula. The very large chunam boxes belonged to important personages and were carried by an attendant.

The arecanut is cut into slices by an instrument, resembling a nut cracker in shape, called an **arecanut cutter.** The handles of these cutters afford considerable scope for artistic display, as will be seen by an examination of the large series here shown.

Elderly persons with failing powers of mastication are in the habit of pounding their betel bolus before consuming it. For this purpose they use a small pestle and mortar called a **betel pounder,** several of which are exhibited.

Above the chunam boxes there are some antique jewel boxes made from Dutch designs in brass and copper, embossed and engraved in various patterns. These are known as **Dutch boxes,** other examples of which are to be found in the Ivory Case and in Case XV.

Below the shelf containing the arecanut cutters there is a large series of brass **tobacco boxes.** These have also been made from Dutch designs, some of them having been actually manufactured in Holland, whence they were brought here during the Dutch Administration.

* Further information on "Sinhalese Measures of Time" is contained in an article by Mr. Herbert White, C.C.S., in The Orientalist, vol. III., 1888–1889, p. 75; and in a paper by Mr. F. H. Modder on Sinhalese Weights and Measures, in Journ. Ceylon R. Asiat. Soc., vol. XII., 1892, pp. 173-202.

The bottom shelf of the case contains some more metal bowls, trays, and goblets.

The picture on the wall over the case is a temple drawing representing an incident in the life of Buddha.

CASE XV.

A portion of this case contains a number of "Dutch boxes," many of which, however, have been made in more recent times. They are made with different kinds of wood—satinwood, calamander, and ebony—and are variously carved and inlaid with ivory, brass, tortoise-shell, and porcupine quills.

The original native wood carving has largely given way to the manufacture of these articles and of ebony and cocoanut elephants. There is also shown here a well-executed carving of a tortoise in calamander wood, the most valuable wood in Ceylon.

Besides the boxes there are some examples of carved combs and hairpins in tortoise-shell and in horn.

On the other side of the case some examples of painted **Kandyan pottery** are shown. There are three classes of unglazed pottery in Ceylon, namely, the plain **Village pottery**, comprising the water chatties, cooking bowls, and curry dishes of every-day use; secondly, the painted pottery of Kandy; and lastly, the **Grotesque pottery** of Matara, examples of which are placed upon the top of the case. This pottery possesses features of ethnographic interest in spite of its grotesqueness; it is made and sold chiefly during the time of the Dondra Fair in the summer months.

CASE XVI.

Kandyan Knives and Swords.—Here are shown numerous swords and daggers used by the Kandyans during the later Dynastic Period and still worn on State occasions. Many of them are highly ornate at the hilt, and the scabbard and base of the blade are often richly damascened. The handle is frequently carved out of ivory, horn, and black coral, and the sheath in some cases is covered with carved tortoise-shell. At the base of the blade in a few instances the figure of a lion in brass is let into the steel. This seems to be of the nature of heraldry.

Some of the dagger sheaths contain in addition to the dagger a receptacle for a *stylus* for writing upon the ola slip.

On the top shelf there is a set of Kandyan **Village jewellery** in the form of numerous brass and glass bangles; and some old Dutch swords and powder-horns.

On the top of the case are some antique spear heads.

SINHALESE INSCRIBED SWORDS.

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TABLE CASE XVII.

A rather heterogeneous assortment of ancient odds and ends is provisionally placed in this case, gold and silver fragments, beads, and gems from the ruined cities of Ceylon. The excavations which have been carried on for many years under the direction of the Archæological Commissioner have not led to any sensational discovery of buried treasure. Such precious relics as have been unearthed have on the whole been disappointing so far as their intrinsic value is concerned.

In the reverse half of this case there is an ola horoscope and a copper sannas or deed conveying a grant of land to a Kandyan temple by the last King of Kandy. There is also shown an ebony weighing lever, called Tuláppadi in Tamil, still used by traders in the Vanni and Jaffna, presented by J. P. Lewis, Esq., C.C.S.

In the glass box over the case there are two old swords, with Sinhalese legends dating from the years 1374 and 1416 inscribed upon them. The inscriptions relate that the swords were presented by the Rajas reigning during the years mentioned (1917 in the Buddhist Era = 1374 in the Christian Era ; 1959 A.B. = 1416 A.D.) in the town of Jayawardhanapura (the modern Kotte, which lies in the outskirts of Colombo) to two members of an aristocratic family upon their appointment as generals. These interesting swords were presented to the Museum by Mr. C. M. Fernando, Crown Counsel.

TABLE CASE XVIII.

Containing a valuable collection of coins which have at one time been current in Ceylon. The coins fall into two classes, namely, the ancient Sinhalese currency, comprising the coins of the Kings of Ceylon ; and the foreign coins introduced to this Island by traders from the days of the Roman Emperors down to the establishment of British Rule. The devices on the coins of the Sinhalese Kings represent on the obverse the king standing, holding a lotus flower in his right hand and a kind of sceptre, sometimes called the trisul emblem, of questionable significance, in his left hand. On the reverse the same figure is repeated in a sitting attitude with the name of the king inscribed to the left of the figure in Nagari-Sanskrit characters.

It has been a too common practice to forge counterfeits of the gold coins for the purpose of deceiving collectors.

The most ancient coins represented in the collection are rectangular pieces of silver with or without figures of animals punched upon them, called Eldlings, which have been found during the excavation of the ruined cities.

Among the rarer Sinhalese dynastic coins may be mentioned the Lion Coin and the Setu Bull Coin, examples of both of which are exhibited. To these may be added the very rare gold Lankeswara coin of Vijaya Bahu, lent by P. E. Pieris, Esq., C.C.S.

Among the foreign coins may be noted the Roman and Arabian coins, Venetian gold sequins, Portuguese silver tangas or tangams, and gold San Thomé coin, the Dutch dukatoons and silver and copper stuivers, and challies minted by various States in the Dutch Confederation. Some of the Dutch copper coins were actually minted in Ceylon, at Colombo, Galle, and Trincomalee. These are marked with the letters C, G, and T, respectively.

The establishment of the Dutch United East India Company (Ostindische Vereenigde Compagnie, indicated on the coins by the monogram VOC) on the Island of Ceylon dates from the year 1655 and lasted until 1802, when the Island was formally ceded to the British (who had occupied it in 1796) by the Treaty of Amiens.

The copper ingots issued by the Dutch, of the value of $4\frac{3}{4}$ stuivers, are a singular form of money.

The general name applied to the ancient Sinhalese coins is "massa." They appear to date only from the year 1153 A.D. to 1296 A.D.

The common copper coins of the Dutch of small value were called challies, a corruption of the Sinhalese word "salliya" (plural "salli"), meaning money or cash in general. The smallest coin now in use, value half a cent, is still called "tamba-salliya," "tamba" meaning copper. The proper coins of the Sinhalese King during the famous captivity of Robert Knox (1659–1679) were fanams of the size of a spangle.

Another interesting form of money is afforded by the Larins or **Fish-hook money.** These are said to have originated at a place called Lari or Laristan on the Persian Gulf. They were formerly made in the Maldive Islands, and were also in use in Ceylon in Knox's time, anybody being allowed to make them. Portuguese copper tangams were also current.

Further information on the ancient coins of Ceylon is contained in the well-known memoir by Professor T. W. Rhys Davids "On the Ancient Coins and Measures of Ceylon," published in 1877 in the International Numismata Orientalia (London, Trübner & Co.).

The ancient beads, coins, and dice discovered at Anuradhapura, Mihintale, and elsewhere have been described and figured by Mr. H. C. P. Bell, C.C.S., the Archæological Commissioner, in his

Fourth Progress Report on the excavations at Anuradhapura and the North-Central Province (Sessional Papers, 1892).

In the large glass shade over this case are shown numerous ancient images, mostly sedent figures of Buddha, including eight thin gold images of Buddha, filled with clay, from Panduwas Nuwara, and above these a similar gold figure from Tissamaharama and gold and crystal dagabas from Anuradhapura. At each end of the cover inside there is a bronze Buddha on a throne backed by a well executed arch called "makara torana." These are called "Enthroned Buddhas." There are also figures of Krishna playing with a ball, and of the goddess Pattini, the latter from Trincomalee. On the top of the case there is a large sedent bronze Buddha of unique design in the attitude of teaching, holding a flower (?) in the left hand. This was discovered twelve miles from Badulla along the new road to Batticaloa, and was presented by G. F. K. Horsfall, Esq., in 1876. On either side of this image there are two common village coloured wood-carvings, one representing a large cobra, the other Buddha seated upon the folds of a cobra and protected by its expanded hood. The latter is called a "Serpent-canopied Buddha."

TABLE CASE XIX.

A selection of silverware occupies the two halves of this case, and in the glass shade above there is a set of Tamil silver bangles, anklets, and toe rings.

Besides some richly damascened Kandyan knives, embossed silver tobacco boxes, and Dutch relic in the form of a silver plate presented by a former Dutch Governor of Ceylon to the person named in the inscription, the principal object in the case is a pair of handsome silver **ola covers** with bejewelled button. They consist of bars of wood painted with dagaba devices on the under side and overlaid with sheets of beaten silver.

TABLE CASE XX.

Examples of Chetty, Tamil, Sinhalese, and Moorish Jewellery.—The large gold ornaments are represented here by silver-gilt replicas. "Chetty" or "Chitty" is the name applied in India to all members of the trading castes in the Madras Provinces. The Colombo Chetties, a caste from Tinnevelly, emigrated to Ceylon about the middle of the sixteenth century. Their language and customs are Tamil.

From an ethnographical point of view among the most interesting objects in this case are the Sinhalese "nawaratna" rings set with the nine principal gems, or as near an approximation as is possible or can be afforded. The nine gems stand for the nine planets (including sun and moon), and the ring is worn as a corrective

for horoscopic purposes; for example, it is worn by a person born under an unfavourable star, and its constant usage is supposed to avert disasters.

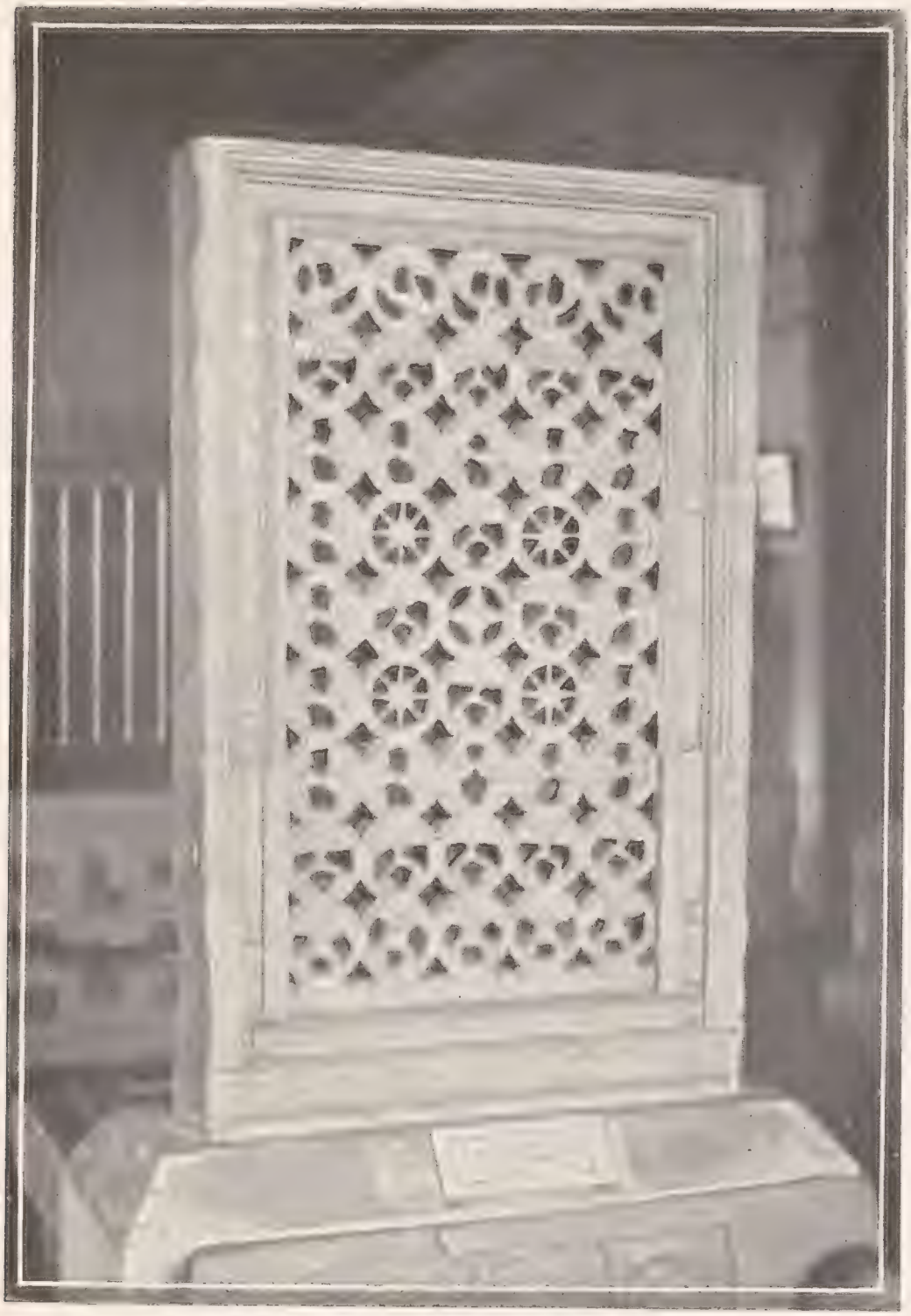
STONE GALLERY.

Many remarkable remains of fallen greatness, illustrating the stupendous grandeur of the ancient religious monuments of Ceylon during the palmy days of militant Buddhism, are exhibited in this gallery. The statues, pillars, friezes, and slabs are carved out of gneiss, the country rock of Ceylon, some of them, however, consisting almost entirely of crystalline limestone.

Among the more notable pieces are the three principal archæological treasures of the Colombo Museum mounted in position along the centre of the room. Facing the south window at the front end of the gallery is a perforated carved slab, 4 feet 8 inches high, 2 feet 10 inches wide, and 7 inches thick, known as the **Yapahu window**, from Yapahu or Yapahuwa, a village in the North-Western Province, about twenty miles north of Kurunegala. It consists of a single block of gneiss cut into the semblance of a frame, which surrounds a composite hieroglyph consisting of forty-five circles in five vertical rows joined together in a moniliform pattern, each circle containing an emblematic figure repeated on both sides of the stone. The matrix of the slab between the carved portions was removed by the artist who designed and executed this unique triumph of stone tracery. In the 13th and 14th centuries there was a royal palace at Yapahu, and the hall of the palace was lighted by two of these tracery windows of exquisite workmanship. We are told by Mr. F. H. Modder that one of these windows "was perfect in 1850, but the other had fallen and its fragments were scattered around. The remaining one would doubtless have soon shared its fate had not Mr. O'Grady, then Government Agent of the North-Western Province, removed it to Kurunegala..... Thence it was transported to Colombo, and now occupies a prominent place among the archæological exhibits at the Museum."

The human figures in the lowest circles represent grotesque manikins, above these are nautch girls, then animals, some of which are provided with a trunk and appear to represent the fabulous "gaja-sinha" or elephant-lion. The star-shaped radiating emblems are the "dharma-chakra" symbols, the wheel or circle of the laws and teaching of Buddha. The birds in the top row are the "hansa" or sacred birds, usually represented by geese, sometimes by conventional representations of birds.*

* For further remarks quoted from an article by Mr. John Bailey, C.C.S., who explored the ruins in 1850, see the paper by Mr. F. H. Modder on "Ancient Cities and Temples in the Kurunegala District: Yapahuwa." Journ. Ceylon R. Asiat. Soc., vol. XIII., 1893, pp. 97–113.



THE YAPAHU STONE WINDOW.

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THE LION OF POLONNARUWA.

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The next megalith which claims attention is the colossal figure of a lion called the **Lion of Polonnaruwa.** This relic of the past is exceptionally valuable and interesting, because there is a Sinhalese inscription on each side near the base giving the date and purport of the monument. Upon it was placed the throne of King Nissanka Malla, a Chakrawarti or Emperor of Kalinga lineage, who was the Lankeswara or Overlord of Lanka (Ceylon) during the years 1187–1196 A.D.

The lion formerly stood in the Council or Audience Hall of the King at Polonnaruwa, whence it was removed to the Colombo Museum about thirty years ago. The ancient name of the city was Pulastipura, the modern name is Topawewa, meaning the tank where the ruined topes or stupas are. It is, however, commonly known as Polonnaruwa, an Elu term of doubtful derivation adopted by Sir Emerson Tennent (*Ceylon*, vol. II., 1847). The ruins were re-discovered in 1820, and all that remained of the Audience Hall where the inscriptions were found were "48 large stone pillars with carved capitals supported on a stone platform, round the base of which are sculptured a row of lions." The great lion-throne "was lying almost entirely buried at some distance from the Hall, and was set up with great difficulty; it had probably been thrown out of the Hall by the Tamils when they took Pulastipura, and may formerly have stood between the inscribed pillars."*

The inscription on the left side of the lion is terminated by the figure of a fish, a symbol of good omen.

The adventures of the lion during its transport from Polonnaruwa to Colombo are recounted by Sir William Gregory (*Autobiography*, second edit., 1894, p. 343), who was at that time (1872–1877) Governor of Ceylon: "Every mishap attended the transfer of this huge stone beast. Its first dray fell to pieces beneath its weight. On descending from the elevated ground where it stood the two elephants attached to it pulled over-vigorously, and the dray and the lion and the elephants flew apart in different directions. It had then to be drawn over a difficult jungle path a distance of fifteen miles from the main road; but the elephants had now learned their business, and these obstacles were surmounted. But

* A facsimile of the inscription on the left of the lion, with translation, is given by Professor T. W. Rhys Davids in his paper on "Inscriptions at the Audience Hall of Parakrama Bahu, Pulastipura, Ceylon," in the Indian Antiquary, vol. II., 1873, pp. 246-249. Pulastipura was the capital of Ceylon from the end of the eighth to the beginning of the fourteenth century. Previously Anuradhapura had been the capital for over a thousand years.

Pulastipura enjoyed its period of greatest magnificence during the long reign of Parakrama Bahu I., surnamed the Great, in the latter half of the twelfth century, preceding the reign of Nissanka Malla.

when it reached the high road the worst of all remained. The wooden bridges, constructed to sustain a moderate load, were quite unable to bear the combined weight of the lion and the dray, and the banks were precipitous and deep. But this, too, was overcome by digging out a sloping passage to the bed of the river and another on the opposite side. The elephants with their immense strength and sagacity sustained the strain of letting down the lion, and easily drew it up again. Much of this took place in the solitary jungle, but when the inhabited regions were approached, the whole country turned out in amazement.....

"The procession of elephants, the lion decked with wreaths and flowers, was a magnificent sight. The tom-tommer from each village joined the *cortège*. The headman of the district asked permission for his little boy to ride the monster into Matale, whence he was to be conveyed by rail to Colombo. The lion now stands calmly in the Museum, and few know, or could understand if told, all the cares it caused and the excitement it created. It is a most valuable archæological record, and would have been undoubtedly destroyed ere this had it not been removed."

The risk of destruction referred to by Sir William Gregory in the foregoing quotation is demonstrated by the fracture on the left side of the head, which is said to have been perpetrated by enterprising burglars ignorant of the solid nature of dynastic art who hoped to find treasure hidden within the penetralia of the body. From the base of the forefoot to the crown of the head the lion stands six feet.

The third object of distinction is an elaborately carved pillar which has been recently set up behind the great lion. This is called the **Medagoda Pillar**, and formerly stood in the Pattini Dewale at Medagoda, six miles below Ruanwella, in the Province of Sabaragamuwa, not far from Yatiyantota. An excellent drawing of this pillar, accompanied by a lucid description quoted below, is contained in the "Report on the Kegalla District of the Province of Sabaragamuwa," by H. C. P. Bell, Esq., C.C.S., Archæological Commissioner (Sessional Papers, 1892, p. 58): "The monolith must originally have been squared to 1 ft. 2 in., the size it assumes across the lion's breast, lotus bosses, and capital fillet. Rising octagonally from the back of a broad-faced couchant lion of conventional type, with frilled mane and raised tail, the shaft slides gradually into the rectangular by a semi-expanded calyx moulding. Half way up relief is given by a bordered fillet 2 in. in breadth, slightly projecting, carved with a single flower pattern repeated round the pillar. From the fillet depend on each face two concentric ..... pearl-bead strings. A few inches above this

STATUE OF PARAKRAMA BAHU AT POLONNARUWA.

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band stand out from alternate faces full-blown lotus knops, 5 in. in circumference, with ornamentation resembling much the Tudor flower upon the intervening sides. Where the pillar becomes square there are further loops of pearls, four on each side. A lower capital of ogee moulding, separated by narrow horizontal fillets, and finished with ovolos and a rectangular band, is surmounted by a four-faced *makara* and a low abacus. From the centre of the roundlet moulding on all four sides drops the garlanded *chakra* symbol."

Other noteworthy stone carvings in this gallery are the **Janitor Stones** from Hanguranketa presented by C. H. de Soysa, Esq., placed before and behind the cement base upon which the Yapahu window now stands ; a mystic square stone called **yantra-gal,** with twenty-five holes, from Anuradhapura, supposed to be a base stone sometimes called a yogi stone (*cf.* H. C. P. Bell, Seventh Report on Anuradhapura, Sessional Papers, 1896, p. 13) ; the **Naga Stone** from Anuradhapura, mounted against the east wall, portraying a large seven-headed cobra in high relief ; friezes from Horana ; figures of Ganesa, the elephant-god, from Horana, presented by Sir C. P. Layard ; marble statue of Buddha from Tissamaharama, presented by Sir C. P. Layard ; friezes and capitals from Anuradhapura ; statue of Buddha in spongy gneiss from Ambagamuwa, presented by Hon. Mr. R. B. Downall (against the west wall) ; cast of the gigantic statue of Parakrama Bahu the Great at Polonnaruwa ; cast of a remarkable **Processional Moonstone** from Anuradhapura (below the south window). The moonstones, perhaps so called in consequence of their semilunar shape, are employed as steps leading into the porticos of the temples. They are often of fine design and execution, and are characteristic of Sinhalese Buddhist architecture. In the cast exhibited here there is a central lotus flower surrounded by concentric processions of hansas and other animals. In front of the stone lion there is another simple **Lotus Moonstone** from Hanguranketa, presented in 1878 by C. H. de Soysa, Esq.

Attention may now be directed to the four wall cases in this room, three of which contain ethnographical models, and the fourth a valuable collection of ancient bronzes.

CASE XXI.

Models of a Kandyan Chief or Ratemahatmaya and of a Buddhist priest with begging bowl ; a temple tapestry hangs at the back of the case.

CASE XXII.

A Low-country Chief or Mudaliyar and a Sinhalese bride.

CASE XXIII.

A man and woman of the Veddas, the aboriginal hunting caste or hill tribe of Ceylon. The bark-cloth bag hanging against the side of the case is made from the bark of the upas tree, *Antiaris toxicaria*, called "riti" in Sinhalese, "metavil" in Tamil, belonging to the same natural order (Urticaceæ) as the Bread-fruit and Jak-fruit trees.

The Veddas used to be an interesting race of forest haunting nomads, but they are rapidly falling victims to civilization, exchanging their ancient skill as bowmen and woodmen for a more sordid if less precarious existence dwindling towards extinction.

They are chiefly to be found in the Province of Uva, but it is possible to tramp through the Province from top to bottom without seeing a sign of a Vedda. Occasionally persons are paraded as Veddas, but when seen away from their natural environment the effect must be pitiful rather than picturesque.

All the models were executed by a local modeller, Mr. R. G. Andriesz.

CASE XXIV.

Ancient Bronzes.—On the top shelf a three-branched **candelabrum** from Munisseram, presented by Hon. Mr. F. R. Saunders; below this a pair of gold-plated bronze curtain frames from Kotte near Colombo, lent by P. E. Pieris, Esq., C.C.S.; numerous miniature bronze figures of gods and animals from Dondra Head; bronze lamps from Munisseram. On the bottom shelf the central object is a large bronze **Kothali** or drinking goblet, with spout fashioned after the manner of an elephant's head and trunk, from Ratnapura, lent by P. E. Pieris, Esq.; also an ancient bronze tripod from Kurúnegala; bronze **hansas** or sacred birds from Munisseram; a heavy bronze **Contemplation Box** with thirty compartments, some of which contain a few coins and other offerings, presented by the Royal Asiatic Society.

SOUTH VERANDAH.

Passing through the doorway at the side of the Bronze Case on to the South Verandah, a Portugese cannon dredged up in the Colombo Harbour in 1888 is an important relic of the Portuguese occupation of the country. Here is also exhibited a polished pillar of Ceylon gneiss from the Mahara quarries employed in the construction of the Colombo Breakwater, presented by John Kyle, Esq.

Returning through the Stone Gallery to the

WEST VERANDAH

a number of inscribed stones will be found, together with two or three Dutch and Portuguese tombstones. The work of collecting and collating the numerous ancient inscriptions scattered over

VEDDAS : THE ABORIGINES OF CEYLON.

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PETIGAMMANA PILLAR.

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the Island was properly organized during the Governorship of Sir William Gregory, when Dr. P. Goldschmidt was appointed Archæological Commissioner to the Government of Ceylon in 1874. His reports were published as Sessional Papers from 1875 until his death in 1877. Dr. Goldschmidt was followed by Dr. Edward Müller, who compiled a valuable manual on "Ancient Inscriptions in Ceylon" (London, 1883), illustrated by a separate quarto book of plates. Dr. Müller left Ceylon in 1881, and was succeeded, after an interval, as Archæological Commissioner by Mr. H. C. P. Bell, C.C.S., under whose direction the work of excavation, discovery, and transcription has been continued from 1890 to the present time.

The great slabs placed against the back wall of the verandah are of interest on account of their antiquity and the characters employed. The first one, propped up lengthwise on the ground, is the oldest inscription that has been discovered at Anuradhapura, from the Ruanweli Dagaba.* It relates to the restoration of certain temples during the reign of King Gaja Bahu (113–125 A.D.).

The upright slab next to the **Ruanweli Slab** is known as the **Tissamaharama Slab**, from Tissamaharama near Hambantota in the Southern Province. It is almost completely preserved, and according to Dr. Müller "is the finest specimen we have of an inscription of the fourth century A.D."†

Adjoining this slab is a narrow flattened stone with an inscription on both faces. The inscription is headed on the obverse side by a symbol of the sun and on the reverse by a crescent representing the moon, the sun and moon being the usual royal signs. It is a grant of land to a temple, and concludes (on the reverse side) with a life-size figure of a crow in sunk relief. This is the **Petigammana Pillar** found half buried in a garden within a few miles of Gampola.‡

Many of these inscribed pillars dating from the tenth century bear, at the top, engravings of the sun and moon as symbols of royalty [Rhys Davids] or eternity and, at the bottom, the dog and crow as symbols of instability [Müller] or meanness; anyone violating the property of the priesthood renders himself liable to the penalty of being re-born in the low condition of one of these animals [Goldschmidt]. The translation of the Petigammana inscription, according to Mr. Bell, ends with the usual curse: "Anyone who disputes this [grant will be born] a crow."

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* Müller's Inscriptions, No. 5, p. 27, and Plate 5.

† Müller's Inscriptions, No. 67, p. 43, and Plate 67.

‡ H. C. P. Bell. Report on the Kegalla District, 1892, p. 79, with plate.

In the middle of the outer side of the verandah there is a large slab, the **Dondra Slab,*** recording the grant of land to the Temple of Vishnu at Dondra Head in the fourteenth century. This slab and the **Dondra Pillar**† at the front outer corner of the verandah are of particular interest on account of their association with Dondra Head near Matara in the Southern Province, the most southerly point of Ceylon. "Like Cape Comorin on the Continent of India," says Professor Rhys Davids (Indian Antiquary, I., 1872, p. 329), "Dondra Head has always been a place of pilgrimage, and seems to have derived its sanctity from its being the extreme southerly point of land, where the known and firm earth ceases, and man looks out upon the ocean—the ever-moving, the impassable, the infinite."

Opposite to the Dondra Slab is the **Mahakalattewa Pillar,** from the bund of a tank of that name six miles from Anuradhapura on the road to Galkulam. It is remarkable for its perfect preservation, not a single letter missing; the inscription is on all four sides.‡

Occasionally other symbols besides those mentioned above are engraved upon the pillars, such as a cobra and a priest's fan. The latter occurs, for example, on the **Kongollewa Pillar**§ (placed near to the Dondra Slab).

The stone slab bearing the Royal Arms of Portugal was found at Menikkadawara in the Kegalla District by Mr. H. C. P. Bell (Kegalla Report, 1892, p. 31, and plate).

Leaving now the West Verandah one crosses the Stone Gallery to the

NORTH VERANDAH

at the back of the Museum, where more tombstones, capitals, inscriptions, &c., will be met with. Here may be noted quaint Portuguese tombstones‖; a couple of Maldivian tombstones characteristically carved in coralline limestone; a "dressed stone" with a Tamil inscription of the fifteenth century from the Kotagama vihare, found by Mr. Bell, who remarks upon the singularity of discovering a Tamil inscription in the heart of a Sinhalese district: this is called the **Kotagama Tamil Slab**¶; another stone

* Müller's Inscriptions, No. 163, p. 71. First translated by Rhys Davids, Journ. Ceylon R. Asiat. Soc., vol. V., 1870–1871, p. 25.

† Müller's Inscriptions, No. 159, p. 69. Rhys Davids, *loc. cit.*, 1872, p. 57.

‡ Müller's Inscriptions, No. 110, p. 55, with plates 110 A–110 D.

§ Müller's Inscriptions, No. 112, p. 55. Kongollewa lies about two miles north of Madawachchi in the North-Central Province.

‖ A fully illustrated and historical account of these tombstones will be found in a paper on "Portuguese Inscriptions in Ceylon," by Mr. J. P. Lewis, C.C.S., to be published shortly in the Journ. Ceylon R. Asiat. Soc.

¶ H. C. P. Bell. Report, Kegalla District, 1892, pp. 68 and 85, with figure on plate facing p. 72.

KOTAGAMA TAMIL SLAB.

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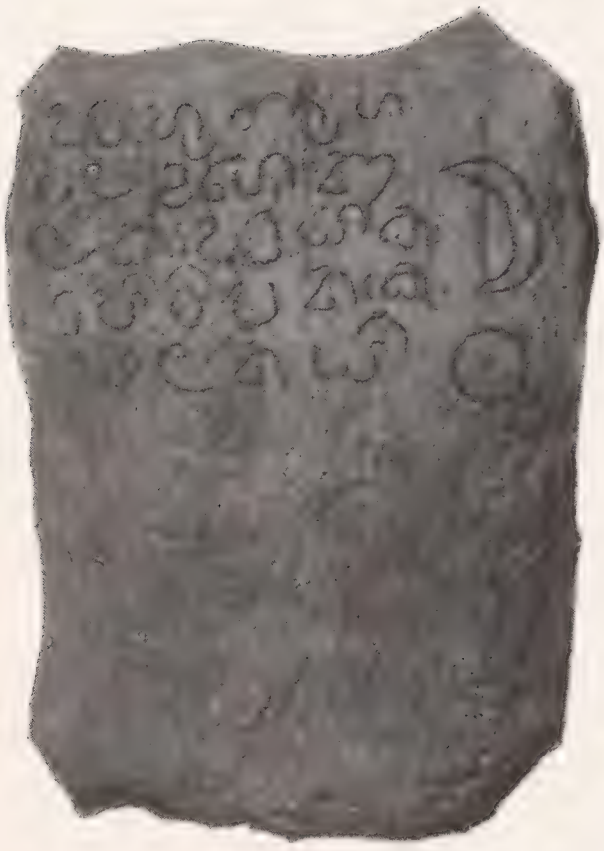

EHUNUGALLA SLAB.

(Photograph by H. C. P. Bell, Esq.)

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WOODEN DOOR AND JAMB FROM DEVANAGALA VIHARE.

(Photographs by H. C. P. Bell, Esq.)

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slab in a corner of the verandah bearing a short Sinhalese inscription with representations of sun (an orb) and the moon (a crescent) is called the **Ehunugalla Slab***; it records a benefaction to a monastery. Close to this stone is an ancient carved wooden door from Dewanagala in the Kegalla District. The solid wings of this door and the left jamb of its frame were found among the lumber underneath the vihare. There are ten plain panels enclosed by framework in high relief carved in a foliage scroll. The carving of the jamb is described as follows: "Between an outer beading and inner splayed edge of lotus petals runs a long narrow panel with gracefully intertwined double scroll of creeper, separating four figures all different from each other. A space half moulded, half panelled, in flower design, intervenes between it and the base panel, in which is placed beside a tree an elephant with head and right forefoot raised and curled trunk."†

The door, which was presented by F. H. Price, Esq., in 1890, was reconstructed at the Colombo Museum. The cross beam on the top with the drooping lotus capitals was brought from the Pinnawala Vihare.‡

Next to the wooden door are two carved wooden pillars mounted as door posts. They belonged to a set of seven balcony pillars found under the eaves of the porch of the Kumbukgama Vihare.§

Opposite to the wooden door are casts of two Peacock Pillars from Anuradhapura. At the other end of the verandah there is a large wooden rice trough or **paddy pounder**, in which the paddy which has previously been trodden out of the corn by bullocks is beaten and husked. Next to this is an old carved **rice mortar** from Ratnapura, like those in constant use at the present day, in which the rice is pounded into flour.

BUDDHA SHED.

In the palm-thatched shed in the grounds behind the Museum further important stone antiquities are exhibited. Chief among these is the large sedent Buddha found by Mr. Bell in the jungle near the Nuwarawewa tank at Anuradhapura.‖ "This Buddha," wrote Mr. Bell in 1890, "is admittedly the finest yet brought to light at Anuradhapura. The wonderful sharpness

* H. C. P. Bell. Report, Kegalla District, 1892, p. 76, with figure on plate facing p. 72.

† *Id.*, p. 49.

‡ H. C. P. Bell, *op cit.*, p. 38.

§ *Id.*, p. 22, with figure on plate.

‖ H. C. P. Bell. First Report on Archæological Survey of Anuradhapura, Sessional Papers, 1890, p. 4 [742]. It is known as the *Toluwila Buddha*, from the hamlet of Toluwila, which adjoins the Nuwarawewa bund at the spot where the statue was found.

and depth of the features, the softness of expression, the symmetry and repose of the body give the image a *tout ensemble* which contrasts markedly with the stolid 'figure-head' appearance so characteristic of these Buddhas in stone."

In front of the Buddha there is a large moonstone of unique and admirable design, embossed with wreaths, festoons, and garlands, a pair of fabulous creatures (makaras) at the sides, and a pair of two-fold representations of the *Sri-patula* or sacred footprints near the base. This is called the **Floral Moonstone** of Hanguranketa, and was presented to the Museum in 1894 by Lady De Soysa.

The representations of the footprint of Buddha, called *Sri-patula*, or *Sri-pada*, of which there are several in this shed carved in stone, are of considerable interest. The best of them is that which is known as the Koddaikeni Stone, a double Sri-pada (like the rest) covered with symbols. The signs on the toes are called *swastika*, the radiant emblem in the centre is the *dharma-chakra*, in front of which are a couple of flags, at the side a fish-hook behind a flower vase, a conch shell, a fan, a pair of fishes representing Pisces, one of the signs of the zodiac ; a complicated cryptic emblem occupies the centre of the heel, and on one side of this opposite to the fishes are the trisul emblems. The exact interpretation of the symbolism of this stone has not yet been attempted.*

Another curious relic is the limestone image representing a man standing in the jaws of a monster, sent by Mr. C. A. Murray from Tissamaharama in 1892. The moonstone and carved steps, with janitors and terminals, which have been arranged at the entrance to the shed, arrived here from Anuradhapura in the years 1882 and 1884.†

The stone discs placed round the convex side of the large Hanguranketa moonstone are described as **mural ornaments** from Anuradhapura.

SIGIRIYA FRESCOES.

On the walls flanking the main staircase will be found copies of the celebrated frescoes discovered in a cave or pocket of the ancient rock fortress of Sigiriya near Dambulla. Sigiriya, the lion rock, rises abruptly from the plains of the North-Central Province to a height of about four hundred feet, with an area of little more than an acre at the summit. It is said to have been fortified by the Sinhalese parricide King Kasyapa, who ascended the throne 475 A.D. and fled to the rock after having immured his

* *Cf.* Memorandum by Messrs. J. P. Lewis and G. M. Fowler, with plate, in Journ. Ceylon R. Asiat. Soc., vol. XI., 1889–1890, Proceedings, pp. lxii, lxiii.

† *Cf.* Administration Reports of the Museum for 1882 (p. 110 D) and 1884 (p. 18 D).

ANCIENT FORTRESS ROCK OF SIGIRIYA.

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father King Dhatu Sen, whose capital was Anuradhapura. Kasyapa made Sigiriya his capital, and took refuge there for eighteen years.

On the western face of the rock chambers have been scooped out, and in one of these, 160 feet from the ground, protected from sun and rain, ancient frescoes were painted upon stucco plastered upon the smooth surface, and still remain in an excellent state of preservation. The ancient approaches to the summit and to the chambers having fallen into decay, the rock once more became nearly inaccessible and, according to local tradition, the haunt of "yakku" or demons. It was however tackled by more than one adventurous climber during the latter half of last century, and in June, 1889, Mr. Alex. Murray of the Public Works Department succeeded in reaching the pocket containing the frescoes

and in making the tracings of them, which he coloured as nearly as possible like the originals. He has left it upon record that the work of copying took him from sunrise to sunset every day for a week lying at full length on his back. A Buddhist priest who visited the chamber gave it as his opinion that the pictures must be the portraits of some of King Kasyapa's queens. The portraits are arranged singly and in couples, the latter representing a maid offering the sacred lotus on a tray to her mistress.

During the last ten years excavations have been carried on at Sigiriya under the direction of the Archæological Commissioner, and fresh copies of the frescoes have been made under his supervision in oil colours, but these have not yet been exhibited in the Museum.

PART II.

ZOOLOGICAL COLLECTIONS.

In the grounds at the back of the Museum a few live animals indigenous in Ceylon are placed on exhibition in temporary shelters. The mammals include a leopard, bears, a tiger cat (*Felis viverrina*), a jackal, palm or toddy cats, civet cats, porcupines, a bandicoot rat, mouse deer, hog deer, &c. The birds are represented by a pelican ibis presented by Her Excellency Lady Blake, a pelican, purple herons, Malay bitterns, India koels, Brahminy kites, scops owl, and an Alexandrine paroquet. A young rufous-bellied hawk-eagle has been loaned by His Excellency the Governor (Sir Henry Blake, G.C.M.G., F.Z.S.). A small tank contains some monitors or water lizards, called "kabaragoya" in Sinhalese, and in a small cage there is a chameleon from Chilaw.

On the other side of the block of buildings in which the Mineral Gallery is situated (see plan) there are two sheds containing respectively, the skeleton of a sperm whale or cachalot (*Physeter macrocephalus*) and of the whalebone whale (*Balænoptera indica*). The carcases of whales are stranded from time to time on the shores of Ceylon. Some of them seem to have met their death at the hands of whalers and to have drifted by gale and current to Ceylon. A whalebone whale was washed ashore in Weligam Bay in August, 1884, such bones as were recovered being placed on the front verandah of the Natural History Gallery upstairs; another carcase drifted ashore at Ambalangoda in September, 1894; the almost complete skeleton was brought to the Museum, and is the one now lying in the large cadjan shed; it measured 65 feet in length. This species of whales has the distinction of being the largest of all known animals, living or extinct.

A spermaceti whale or cachalot stranded on the south coast of Mannar in September, 1889; its remains are now exhibited in the smaller shed, with the exception of the lower jaw, which dropped into the sea while the work of salvage was proceeding and was lost. Another carcase arrived at Athuruwila near Bentota in June, 1904, in a high state of decomposition; the lower jaw, which alone carries the functional teeth, was missing. In November, 1904, another decomposed sperm whale minus the lower jaw was stranded at Mount Lavinia. The teeth of the upper jaw of the sperm whale are vestigial structures imbedded in the gum.

At the foot of the main staircase leading to the upper floor of the Museum there may be seen a small glass case containing

GROUP OF SAMBUR (*Cervus unicolor*) AND WILD BOAR (*Sus cristatus*).

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SPOTTED DEER (*Cervus axis*), LEOPARD (*Felis pardus*), AND MONKEYS (*Semnopithecus priamus*).

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living insects, **leaf insects** of the genus *Phyllium*, remarkable for their general resemblance to the leaves of the guava, on which they are fed. The males are smaller than the females, less numerous, and carry two long feelers or antennæ, held backwards, nearly as long as the body. The females lay their eggs, which resemble seeds, freely, and the young hatch out without difficulty.

The Natural History Collection comprises representatives of the fishes, amphibia, reptiles, birds, mammals, insects, crustacea, and mollusca occurring within the zoological province of Ceylon.

The centre of the gallery is occupied by a **jungle scene** containing sambur deer, commonly known as elk, a wild boar, a crocodile, peacock, and several smaller birds. Most of the specimens were obtained from the Hambantota District in the Southern Province, where all of the species are to be found.

Opposite to this group, over the head of the staircase, is a group of spotted deer, leopard, and monkeys, the material for which was also obtained from the same locality. The monkeys on the tree overhead belong to the common low-country species of the Maritime Provinces, *Semnopithecus priamus*.

BIRDS.

The birds of Ceylon comprise large numbers of **migratory species**, which visit the Island during the north-east monsoon, but do not breed here ; the chief bird of this kind is the Flamingo. Then there are numerous **resident species**, which are indigenous to Ceylon, but occur also in the Indian Peninsula and elsewhere ; the chief bird of this kind is the Peafowl. There are no fewer than forty-nine **endemic species**, which are peculiar to Ceylon, not being found beyond the confines of the Island; the chief bird of this kind is the Ceylon Jungle-fowl. Lastly, there are a few **occasional visitors**, which do not come regularly, putting ashore here through stress of weather ; the chief bird of this kind is the Frigate-bird.

BIRD CASE I.

Turning to the left (east) from the staircase the first bird case, beginning from the top shelf in front, contains representatives of the Frogmouths (Podargidæ); the Trogons (Trogonidæ); the Cuckoos, Koels, Malkohas, and Coucals (Cuculidæ); Paroquets and Loriquets (Psittacidæ); Owls (Strigidæ). The Ceylonese Frogmouth (*Batrachostomus moniliger*), which also occurs in Travancore, is a remarkable bird on account of the oddness of its gape, curiously resembling the mouth of a frog. Of the cuckoos, the genus *Surniculus*, represented by the species *S. lugubris*, the Drongo Cuckoo, is remarkable for its extraordinary resemblance to a Drongo or King Crow (*Dicrurus*). It is said to lay its eggs

in the nests of King Crows, and the latter have been actually observed in the act of feeding a young *Surniculus*.* This therefore appears to be an example of natural mimicry.

The Red-faced Malkoha (*Phœnicophaës pyrrhocephalus*) is peculiar to Ceylon,† as is also the Ceylonese Coucal (*Centropus chlororhynchus*). Both of these species inhabit dense and damp forests. The Common Coucal or Crow-pheasant (*Centropus sinensis*) is known locally as the Jungle Crow. It is a familiar bird in the low-country jungles and in the vicinity of villages, its chestnut-coloured wings offering a handsome contrast to the glossy black body. It is a ground-feeding bird, eating insects, lizards, and small snakes.

The Indian Koel (*Eudynamis honorata*) is another familiar Indo-Ceylonese bird. In the breeding season, from March till July, its cry of *ku-il ku-il*, increasing in intensity and ascending in the scale, is to be heard in almost every grove [Blanford, *l.c.*, p. 229]. In Ceylon it is known to Europeans as the Brain-fever bird, on account of the persistency of its cry. It feeds on fruit, and, like the cuckoos, is parasitic in its nesting habits, laying its eggs in May and June in the nests of crows, generally the Indian or Gray Crow (*Corvus splendens*), less frequently in those of the Black Crow (*Corvus macrorhynchus*). The crows bring up the koels, which at times eject the young crows from the nest after they have been hatched [Blanford]. The male is black throughout; the female is spotted with white.

The principal parrot of Ceylon is sometimes called the Alexandrine Paroquet (*Palæornis cupatria*), coloured green, with (in the male) a broad rose-pink collar round the nape. The little Ceylonese Loriquet (*Loriculus indicus*) is peculiar to Ceylon. The parrot which is commonly used as a cage bird by the natives of Ceylon is the Rose-ringed Paroquet (*Palæornis torquatus*).

Of the owls which are shown in the bottom shelf, the Ceylon Bay Owl (*Photodilus assimilis*), peculiar to Ceylon, is to be noted on account of its rarity, being found only in the hills round Kandy. The Demon bird, or "Ulamá" of Ceylon, so-called on account of its dreadful moaning hoot, is commonly identified with *Huhua nepalensis* (= *Bubo nipalensis*) and also with *Syrnium indrani*.

In the other half of this case, commencing at the top, are shown the Barbets (Capitonidæ), of which the Yellow-fronted Barbet (*Cyanops flavifrons*) and the pretty little Ceylon Barbet (*Xantholæma rubricapilla*) are peculiar to the Island; Indian Rollers

* Blanford, W.T. Birds of India, 1895, vol. III., p. 224.

† The distribution of the different species of birds is indicated in red upon the small maps placed below the specimens.

(Coraciadæ) ;* Bee-eaters (Meropidæ) ; Kingfishers (Alcedinidæ) ; Hornbills† (Bucerotidæ), two species, one of which (*Lophoceros gingalensis*) is peculiar ; Hoopoes (Upupidæ) ; Swifts (Cypselidæ), one of which, the Edible-nest Swiftlet (*Collocalia fuciphaga*), builds the well-known edible nests in caves, small cups made of grass, moss, and feathers cemented together by inspissated saliva [Blanford, *l.c.*, p. 177] ; Nightjars (Caprimulgidæ), which lay their eggs on the ground without any nest.

BIRD CASE II.

The second case alongside the first contains some of the Doves and Pigeons (Columbidæ), including *Turtur risorius*, the Ring-dove, and *Columba intermedia*, the Indian Rock Pigeon, from which all the breeds of domestic pigeons peculiar to India are derived. The Galline or true game birds of Ceylon belong to the Pheasant family (Phasianidæ). First in order and importance comes the Peafowl, referred to and exhibited elsewhere ; then the endemic Ceylon Jungle-fowl (*Gallus lafayetti*), characterized by its peculiar call and by the yellow patch in the centre of the comb of the male ; the endemic Ceylon Spur-fowl (*Galloperdix bicalcarata*), which only occurs in the southern half of the Island ; finally the Quails and Partridges. The Gray Partridge (*Francolinus pondicerianus*) is common in India, but is only found in the northern half of Ceylon and in the small islands (Delft, Iranativu, &c.) off the Jaffna Peninsula. The Painted Partridge (*F. pictus*), unrepresented in the Museum collection, is another Indo-Ceylonese bird localized in Ceylon to the highlands or patanas between Nuwara Eliya and Badulla.

The Three-toed Quails, represented here by two female Bustard Quails (*Turnix pugnax*), belong to a separate order, Hemipodii, and family, Turnicidæ. The females are larger and more highly coloured than the males, and "the ordinary conduct of the sexes during the period of incubation is reversed, for the male alone sits on the eggs and tends the young brood, whilst the females wander about, uttering a purring call that serves as a challenge, and fight each other" [Blanford, Faun. Ind. Birds, vol. IV., p. 150].

Of the Rails, Crakes, Moorhens, and Watercocks (Rallidæ), Baillon's Crake (*Porzana pusilla*) is to be noted for its rarity in Ceylon ; the Moorhen (*Gallinula chloropus*) ranges from Great

* The Indian Roller (*Coracias indica*) is common at Jaffna, Anuradhapura, &c., and is known to Europeans as the Low-country Jay, but it is a Picarian bird related to the Bee-eaters and Kingfishers, not a Passerine bird of the Crow family. It is fond of perching on telegraph wires.

† The Hornbills of the Ethiopian, Oriental, and Papuan regions are the representatives of the Toucans (Rhamphastidæ) of South America, and are sometimes popularly confounded with the latter.

Britain through Europe, Asia, and Africa, and occurs in the tanks of Ceylon, though rare; finally, the Purple Moorhen (*Porphyrio poliocephalus*) is a handsome Indo-Ceylonese bird common in parts of the low-country.

The bottom shelf in front commences the series of Limicoline birds, Plovers and Snipes and their allies. The Stone Curlew (*Œdicnemus scolopax*) is a north-east migrant to Ceylon, the Great Stone Plover (*Esacus recurvirostris*) is a resident shore bird; both belong to one family, the Œdicnemidæ. The Crab Plover (*Dromas ardeola*), another shore bird, which also breeds in Ceylon, is the sole type of the family Dromadidæ.

In the reverse half of this case, commencing from the top, will be found Courier Plovers and Swallow Plovers, shore birds of the family Glareolidæ; Water Pheasants (*Hydrophasianus chirurgus*), Parridæ, a common low-country bird; the Turnstone, Lapwings, Plovers, Oyster-catcher, Stilt,* Avocet,† Curlew, Whimbrel, Sandpipers,‡ and Stints, all shore birds and waders belonging to the family Charadriidæ; Woodcock (*Scolopax rusticula*), a rare migrant, and Snipes (Scolopacidæ), of which the best known are the Pintail Snipe (*Gallinago stenura*), a north-east migrant common from September to April, and the Painted Snipe (*Rostratula capensis*), a resident of the low country, widely distributed in South Asia and Africa.

Many of the shore birds, like the sea birds, gulls, and terns, have a very wide distribution. The circum-littoral range of the Turnstone (*Strepsilas interpres*) throughout both hemispheres is remarkable. The Oyster-catcher (*Hæmatopus ostralegus*) is confined to the Old World. The range of the Gray Plover (*Squatarola helvetica*) is world-wide; it breeds in the far north and is a winter visitor to India, Ceylon, and Burma [Blanford].

BIRD CASES III. AND IV.

The next couple of bird cases contain the one a group of Accipitrine birds,§ Eagles, Hawks, Falcons, and Kestrels; the other a group of Peafowl (*Pavo cristatus*). This latter is the principal game bird of Ceylon, and in fact the most stately bird in the Island. A frequent ornament in parks and gardens in Europe, it lives here in its native haunts. It feeds and nests upon the ground, but roosts in the topmost branches of trees, whence it

* Shown in another case (see below).

† An occasional migrant, not in the Museum collection.

‡ The Sandpipers are well known locally by the colloquial Sinhalese name "siri-biri"; they are also sometimes called Snippets, because they somewhat resemble Snipes in their habits.

§ Other Accipitrine birds, Harriers and Falcons, are shown in another case (see below).

PEAFOWL.

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surveys the country round and is consequently difficult to approach. A male in perfect plumage is shown perched upon a tree ; a dun-coloured female and a partridge-like young are placed on the floor of the case.

BIRD CASE V.

Passing now towards the other side of the gallery the remaining bird cases may be inspected, commencing with the case next to the stairs facing the Sambur and Boar Group. Here are some of the Passerine birds. The order Passeres comprises about one-third of the entire avian fauna of Ceylon. The front half of this case contains Orioles (Oriolidæ), represented by the brilliant yellow-bodied black-headed *Oriolus melanocephalus ;* Mynas and Starlings (Sturnidæ), of which three are peculiar, namely, the Ceylon Myna, known to ornithologists as the Ceylon Grackle* (*Eulabes ptilogenys*), the common Ceylonese Myna (*Acridotheres melanosternus*), which is used extensively as a cage bird by the boutique-keepers and other residents, and the White-headed Myna or Starling (*Sturnornis senex*), an inhabitant of the mountain forests of Ceylon ; Thrushes and Black-birds (Turdidæ), of which the Ceylon Black-bird (*Merula kinnisi*), a resident of the forests above 2,500 feet, the Buff-breasted Ceylon Thrush (*Oreocincla imbricata*), and the Spotted Thrush (*Oreocincla spiloptera*) are peculiar ; Flycatchers (Muscicapidæ), of which the Ceylonese Blue Flycatcher (*Stoparola sordida*) is endemic, while the Paradise Flycatcher (*Terpsiphone paradisi*), locally known as the Ceylon Bird of Paradise, is an exquisite and highly characteristic Indo-Ceylonese resident. The Paradise Flycatcher is not uncommon, though it is rarely seen about Colombo. The male bird undergoes remarkable changes of plumage, which are illustrated by the specimens exhibited.

After the autumn moult of the second year the male has the whole head and crest glossy black [throat brown, breast ashy, belly white], and the whole upper plumage rich chestnut; the median tail feathers grow to a great length, and are retained till May or June, when they are cast. After the autumn moult of the third year the chestnut plumage is again assumed, and also the long median tail feathers, but the whole lower plumage from the throat downwards is pure white, the breast being sharply demarcated from the black throat. After this moult a gradual transition to the white upper plumage takes place, the wings and tail being the first parts to be affected, but the change to a complete white plumage is not affected till the moult of the fourth autumn. After this moult the male bird is fully adult, and permanently retains the white plumage ; the head, neck, and crest are glossy bluish black ; the whole body plumage white.†

* This species is placed by Mr. E. W. Oates (Fauna Brit. Ind., Birds, vol. I., p. 513) in a separate family, the Eulabetidæ.

† Oates, E. W. Fauna Brit. Ind., Birds, vol. II., 1890, p. 46.

Just as the Indo-Ceylonese Peafowl is replaced in Burma by a distinct species (*Pavo muticus*) which ranges southwards to Java, so the Paradise Flycatcher of India and Ceylon is represented in Burma by an allied species (*Terpsiphone affinis*).

The robins are closely related to the flycatchers on the one hand and to the thrushes on the other. The Black Robin (*Thamnobia fulicata*) and the Magpie Robin (*Copsychus saularis*) are, next to the crows, the sparrows, and the babblers, the commonest birds in Colombo and throughout the Island; the Long-tailed Robin, known to ornithologists by its Hindustani name "Shama," is a shy jungle-bird.

In the reverse half of the case are shown Weaver birds and Munia Finches (Ploceidæ), the Hill Munia (*Uroloncha kelaarti*) being peculiar; Sparrows (Fringillidæ), the House Sparrow (*Passer domesticus*) ranging from Great Britain to South Asia; Swallows (Hirundinidæ); Wagtails and Pipits (Motacillidæ): the Gray-headed Wagtail (*Motacilla borealis*) ranges all over Europe, Asia, and North Africa, and may be seen on the Galle Face Parade during the north-east season from September to May; Larks (Alaudidæ); Sun birds* (Nectariniidæ) and Flower-peckers (Dicæidæ), the former with long bills, the latter with short bills, both families being distinguished from all other Passerine birds by the serration of both mandibles of the beak; the Indian Pitta or Ground Thrush (Pittidæ), a characteristic north-east migrant. Finally, the bottom shelf of the case contains the Woodpeckers† (Picidæ), a very distinct family of birds well represented in Ceylon. The type skins of Legge's Woodpecker (*Brachypternus intermedius*) were presented by Sir W. H. Gregory. This variety is believed to be a hybrid between the Golden-backed Woodpecker (*B. aurantius*), and the common Red-backed Woodpecker (*B. erythronotus*), which is peculiar to Ceylon. Layard's Woodpecker (*Chrysocolaptes stricklandi*) is also confined to Ceylon.

BIRD CASE VI.

The case adjoining the one just described, commencing from the top of the reverse side, contains more Passerine birds, namely, the Crows, Jays, and Titmice (Corvidæ), the Ceylonese Jay (*Cissa ornata*), coloured chestnut and blue, being endemic. This bird is sometimes known as the Ceylon Magpie. It is a forest bird of shy habits, feeding a good deal on the ground [Oates].

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* The Sun birds are the representatives in the Old World of the Humming birds of the New World, and like the latter can poise themselves on the wing while extracting nectar from flowers. They are frequently seen in Colombo feeding upon the *Hibiscus* flowers.

† The Woodpeckers are Picarian birds, not Passerine.

The Babblers (Crateropodidæ) of Ceylon are remarkable for the large number of endemic species, namely, the Ceylonese Rufous Babbler (*Crateropus rufescens*), the Ashy-headed Babbler (*C. cinereifrons*), the Ceylonese Scimitar Babbler (*Pomatorhinus melanurus*), the Ceylon Yellow-eyed, black-billed Babbler (*Pyctorhis nasalis*), the Brown-capped or Quaker Babbler (*Pellorneum fuscicapillum*) occurring between 5,000 and 6,000 feet elevation, the Ceylon Black-fronted Wren Babbler (*Rhopocichla nigrifrons*), the Ceylon Arrenga or Whistling Thrush (*Arrenga blighi*), rare at 4,000 feet, the Ceylon Shortwing or Ant Thrush (*Elaphrornis palliseri*), and the Ceylon White-eye (*Zosterops ceylonensis*) occurring above 1,500 feet.

The Bulbuls also belong to the Crateropodidæ, of which they form a sub-family, Brachypodinæ. They are shown at the bottom and continued on the top shelf of the front side of the case. The Yellow-eared Bulbul (*Kelaartia penicillata*) is endemic.

Next follow the Drongos or King Crows (Dicruridæ), so called because of their remarkable habit of persecuting the crows, which are double their size. They pursue and chivvy the crows on the wing with no other apparent object than pure love of mischief; they also frequently perch upon the backs of cattle. The species which is especially tyrannical with regard to the crows is the Black Drongo (*Dicrurus ater*). Another exhibited species (*D. leucopygialis*) is confined to Ceylon, while the Racket-tailed Drongo (*Dissemurus paradiseus*) is distinguished by the great elongation of the lateral tail feathers with their spatulate tips.

The Warblers (Sylviidæ) represent another extensive family of small birds, the most remarkable of those which occur in Ceylon being the Indian Tailor bird (*Orthotomus sutorius*), a nest of which with the leaf-edges sewn together is exhibited.

Lastly, the Shrikes and Minivets (Laniidæ) complete the display in this case. The Orange Minivet (*Pericrocotus flammeus*) bears a strong resemblance to the oriole in the general colour-pattern of the plumage.

BIRD CASES VII. AND VIII.

These cases contain groups of birds arranged according to habits and distribution, but without reference to their position in classification. One of them consists of a selection of birds from the Vanni District of the Northern Province, that portion of the Province which stretches between the settlements of Mullaittivu and Vavuniya. The other is a group of Waders and Divers, comprising Flamingoes, Stilts, Herons, Darter, &c.* The Flamingo

* The Cormorants (exhibited in the adjoining case and also in Bird Case XII., see below) of the genus *Phalacrocoraæ* are allied to the Darters, and form with the latter the family Phalacrocoracidæ, diving and fishing birds.

(*Phœnicopterus roseus*) is a north-east migrant to Ceylon frequenting the salt lakes of the Hambantota and Mullaittivu Districts. It is essentially gregarious, living and breeding in large colonies. The movements of a flock are remarkably concerted, and at the least alarm they rise with one consent like a pink cloud across the horizon. The three specimens exhibited are females in different stages of plumage.

The Darter (*Plotus melanogaster*) is sometimes called the Snake bird, on account of its long serpentine neck, which is persistently kinked. The method of feeding was described by Mr. W. A. Forbes as follows* :—"The darters feed entirely under water. Swimming with its wings half-expanded, though locomotion is effected entirely by the feet, the bird pursues its prey with a peculiar darting or jerky action of the head and neck, which may be compared to that of a man poising a spear or harpoon before throwing it. Arrived within striking distance the darter suddenly transfixes the fish on the tip of its beak with marvellous dexterity, and then immediately comes to the surface, where the fish is shaken off the beak, thrown upwards, and swallowed, usually head first." When swimming at the surface the body is submerged, only the head and neck projecting above the water. The darters are common about the tanks of Ceylon. When resting on a tree the wings are held expanded as shown. The stomach of this bird is provided with a dense hairy plug or sieve guarding the entrance to the small intestine.

BIRD CASES IX. - XII.

The remaining birds which are placed on exhibition are shown in the recess facing the Sambur and Boar Group. In Case IX. are the birds of largest bulk occurring in the Island, gigantesque Storks and Herons, Spoonbills, and Pelican Ibis or Painted Stork. Case X. contains Harriers (Falconidæ) and Bitterns (Ardeidæ, the Heron family). The Malay Bittern (*Gorsachius melanolophus*) is a north-east migrant to Ceylon, arriving towards the end of October and beginning of November, and fugitive specimens are frequently captured about this time in Colombo, sometimes landing in the streets of the Fort and in the ball-room of Queen's House.

Case XI. contains Gannets or Boobies (Sulidæ), oceanic birds sometimes taken here, and Ibis (Ibididæ), tank birds. Finally, Case XII. contains Ducks and Teals (Anatidæ), Terns and Gulls (Laridæ), Frigate birds (Fregatidæ), Cormorants and Darters (Phalacrocoracidæ), Pelicans (Pelecanidæ).

* W. A. Forbes. On some points on the Anatomy of the Indian Darter (*Plotus melanogaster*) and on the Mechanism of the Neck in the Darters (*Plotus*), in connection with their habits. P. Zool. Soc., London, 1882, pp. 208-212.

FLAMINGOES AND OTHER WADERS.

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MAMMALS.

Besides the mammals living in the grounds and those which have been mentioned above in connection with the groups in the centre of the gallery, further examples are shown in the western alcove. Several of the eighty species of mammals recorded from Ceylon possess insular characteristics ; even such a large creature as the sambur is said to differ in some respects from its Indian co-type, but there is nothing like the same degree of endemicity among the mammals as has been remarked for the birds. As distinctive Ceylonese mammals may be mentioned the Golden Paradoxure or Palm Civet (*Paradoxurus aureus*) and the Ruddy Mungoose (*Herpestes smithi*), both of which are called by the same Sinhalese name "Hotambuwa."

There are two principal kinds of monkeys in Ceylon, called respectively in the native language "Rilawa" and "Wandura," referred to by Knox in the anglicized terms "Rillows" and "Wanderows." The former are the Macaques (*Macacus pileatus*), with cheek pouches ; the latter are the Langurs, comprising several species of the genus *Semnopithecus*, monkeys destitute of cheek pouches. Troops of "Rillows" and "Wanderows" may sometimes be seen on the same tree, but as a rule they keep to themselves.

There are three distinct species of "Wanderows" in Ceylon. The commonest is the Madras Langur or Crested Monkey (*Semnopithecus priamus*), which frequents the low-lying forests of the dry maritime districts of the North, East, and South. In addition to the crest of hair on the head this monkey is further distinguished by the fringe of long black hairs of the eyebrows, known as the supra-orbital fringe.

The Purple-faced Monkey (*S. cephalopterus*) is without the crest and fringe ; it inhabits the damp forests of the West at low and moderate elevations up to about 1,000 feet.

Finally, the Bear Monkey (*S. ursinus*), described as endemic, is the monkey of the mountains, occurring in the country round Nuwara Eliya. It is closely related to *S. cephalopterus*,* of which it may be a hill variety, and from which it is distinguished by its longer and denser fur.

The remarkable Prosimian family of the Lemurs, whose headquarters are in Madagascar, is represented in Ceylon by a single species, *Loris gracilis*, a small tailless, large-eyed, nocturnal, arboreal creature of retiring habits, sometimes called the Ceylon Sloth. It is omnivorous, feeding upon young leaves, insects,

* A young live Bear Monkey presented by J. Spearman Armstrong, Esq., from Kotagala, and a Purple-faced Monkey from Horana, are exhibited in the grounds at the back of the Museum.

spiders, birds' eggs, birds, and lizards. It will also eat plantains and boiled rice, and will drink milk, but is not easy to keep alive in captivity unless taken young and reared with great care.

The skeleton of an elephant shot by H. W. Varian, Esq., said to be the largest recorded from Ceylon, is remarkable for the small size of the tusks, which are reduced to mere tushes. The skull of a large tusker is, however, shown below. Tuskers are rare in Ceylon, and are believed to be the descendants of imported Indian elephants. Another elephant skull in section is lying on the floor next to the skeleton of the sambur. There are also skeletons of the wild buffalo, wild boar, and the bear. Of the other stuffed animals, a pair of large leopards, the bear, the otter, and the pangolin may be noted specially. The Indian Pangolin or Scaly Ant-eater (*Manis pentadactyla*) is one of the most curious mammals found in Ceylon. It is a nocturnal burrowing animal not often seen; its jaws are destitute of teeth (Edentata), and its tongue is exceedingly long and vermiform, adapted for penetrating into the burrows of termites or white ants, upon which it feeds. Its scales are sometimes employed for making imitation tortoise-shell combs. One such comb, presented by H. J. V. Ekanayake, Esq., of Balapitiya, is exhibited. The Indian Pangolin is represented in Burma by an allied species *M. javanica*, which ranges through the Malay Peninsula, Sumatra, Java, Borneo, and Celebes. There is also a Chinese Pangolin (*M. aurita*) in Nepal, Assam, Southern China, and Formosa. Several species of the same genus occur in Africa.

There are three sorts of flying mammals in Ceylon, namely, the Fruit Bats or Flying Foxes (Pteropodidæ), the small Insectivorous Bats (Microchiroptera), and the Flying Squirrel, *Pteromys oral* (Rodentia Sciuridæ). The Insectivorous Bats comprise the Leaf-nosed Bats (Rhinolophidæ); the Vampire Bats (Nycteridæ), which feed upon frogs, rats, and smaller bats, as well as insects; the Pipistrelles (Vespertilionidæ); and the Sheath-tailed Bats (Emballonuridæ). The Flying Squirrel has approximately the same general distribution throughout India, Burma, and Ceylon as the Flying Fox (*Pteropus medius*), inhabits the same districts, and is also frugivorous and nocturnal. It is not however gregarious, and does not suspend itself head downwards, as do the fruit bats and other bats, but rests in the ordinary attitudes of arboreal mammals.

The aquatic mammalia (Whales, Dolphins, Porpoises, and Dugongs) are represented by an excellent set of dugongs, male, female, and young, and a skeleton. The female specimen exhibited is 10 ft. long; it was captured at Kayts near Jaffna. The Dugong

ELEPHANT KRAALING.

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(*Halicore dugong*) is a gentle creature feeding on seaweeds ; it allows itself to be handled and killed without resistance. It occurs off the north-west coast of Ceylon near Jaffna and Mannar, and ranges from East Africa to Australia. Kelaart, one of the pioneer naturalists of Ceylon, says that he saw shoals of them on the coast of Arippu during the Ceylon pearl fisheries of 1835 and 1836, but they are now scarce. The order Sirenia, to which the dugong belongs, is represented in tropical America by the manatee. The tusks of the dugong are the two upper incisors, which, with two or three molars on each side of both jaws, are the only teeth found in adults.

On the top of the Dugong Case is the skeleton of a rare cetacean, *Pseudorca crassidens*, the Lincolnshire Killer, prepared from a specimen caught at Moratuwa in 1891, the first recorded from Indian seas. It is said to feed on cuttle fish, whereas the true grampus or killer attacks and kills the largest whales. The Lincolnshire Killer owes its common name to the circumstance that its skeleton was first discovered in a Lincolnshire fen.

Besides this skeleton there is a stuffed specimen of a dolphin caught at Negombo in 1883. Its identification is somewhat uncertain, but it appears to be closely similar to Elliot's Dolphin (*Steno perniger*).

The smaller mammals of Ceylon (apart from the bats and lemur) comprise many species of the Rodent order (Squirrels, Rats, Mice, Hares, and Porcupines). The little squirrel which is a familiar figure on the trunks and branches of trees in Colombo is called *Sciurus palmarum*. The larger tree-squirrel of the low-country jungles in dry districts is *Sciurus macrurus*, locally known as the Rock Squirrel or " Danduléna." The largest rat is the Bandicoot or Pig Rat (*Nesocia bandicota*), found in all parts of the Island from the sea-level to Nuwara Eliya. It exceeds a foot in length, exclusive of the tail. Next to this in size and interest comes the Gerbille or Antelope Rat (*Gerbillus indicus*), a field rat. The common House Rat and the Mouse have been introduced here as to all other parts of the world. The Musk Rat is more properly called the Musk Shrew (*Crocidura murina*) ; it is not a Rodent, but belongs to the family of Shrews (Soricidæ) in the order Insectivora. It is common in bungalows, outhouses, and compounds in Colombo, and often it appears in the roads at nightfall. It is pale gray in colour, utters a characteristic squeak, and has a long, tapering snout. Finally, the Black-naped Hare (*Lepus nigricollis*), the Chevrotain or Mouse Deer (*Tragulus meminna*), and the Muntjac or Rib-faced Barking Deer (*Cervulus muntjac*), commonly called the Red Deer, must be mentioned.

REPTILES AND AMPHIBIA.

The collection of reptiles and amphibia is contained under glass shades over the table cases. The largest reptiles are the Crocodiles, Monitors, and the Python. There are two species of crocodiles in Ceylon, the Tank Crocodile (*Crocodilus palustris*), with a comparatively short snout, and the River Crocodile (*C. porosus*). with a longer and narrower snout. The former is represented by the skull of a large specimen from the Minneri tank,* the latter by a young stuffed specimen in the Sambur and Boar Group. There are also two species of monitors, the large Water Lizard or "Kabaragoya" (*Varanus salvator*), of which a skeleton is exhibited in the gallery and some live specimens in the grounds; and secondly, the Land Monitor (*V. bengalensis*), a smaller species, which lays its eggs in the nests of termites.

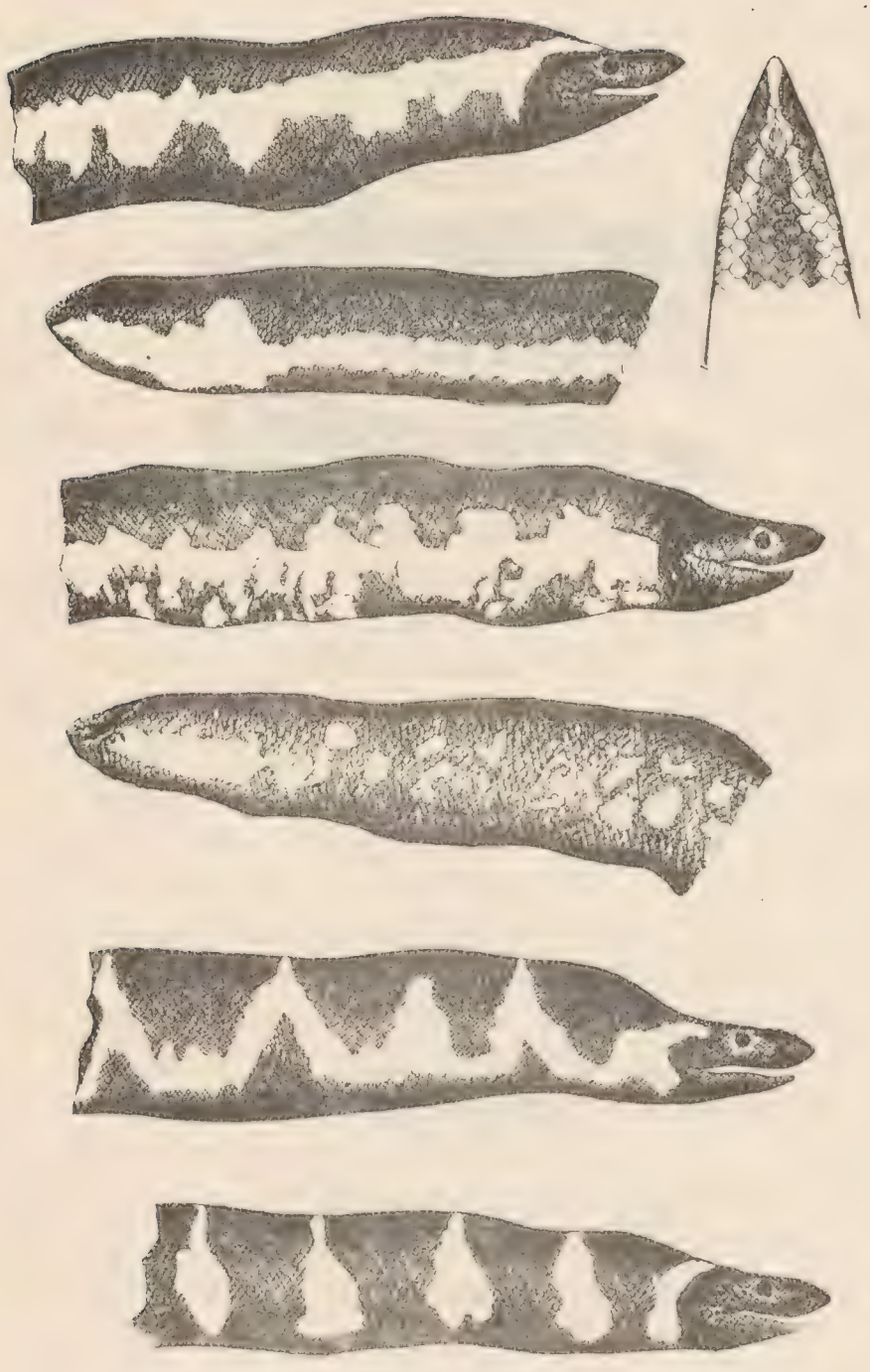
Some eighty-one species of snakes have been recorded from Ceylon, including twenty-six sea snakes (Hydrophidæ). The latter are all poisonous, but of the land snakes only six or seven are poisonous, the most deadly being the Cobra (*Naia tripudians*), the Tic Polonga or Russell's Viper (*Vipera russelli*), and the Bungarums or Kraits (*Bungarus ceylonicus* and *B. cæruleus*).† Examples of these are shown over the second table case to the left of the staircase. The Crotaline or Pit Vipers, so called on account of the existence of a deep pit of unknown significance on each side of the snout between the eyes and the nostrils, are not fatal to man. They are represented in Ceylon by the "Karawala" (*Ancistrodon hypnale*) and the Green Polonga (*Trimeresurus trigonocephalus*).

There is a very common non-poisonous snake which mimics the dreaded *Bungarus ceylonicus* in its scheme of coloration, namely, white transverse bands upon a dark ground colour, and is sometimes mistaken for it when seen at a distance or when examined casually. This is *Lycodon aulicus*, a snake which is frequently found trespassing in bungalows in Colombo. The *Bungarus* occurs chiefly up-country in the country round Peradeniya, Dimbula, Balangoda, and elsewhere.

A large *Python molurus* is mounted in the east alcove; some Hydrophidæ are shown over the third case; the snakes on the fifth case include a large Green Polonga and a large Tic Polonga, somewhat faded; over the sixth case are the Whip snakes (*Dryophis*); the "Pol-mal Karawala" (*Chrysopelea ornata*), which when fresh shows bright red spots along the back, reputed poisonous, but in reality harmless and of gentle disposition; the fresh-water

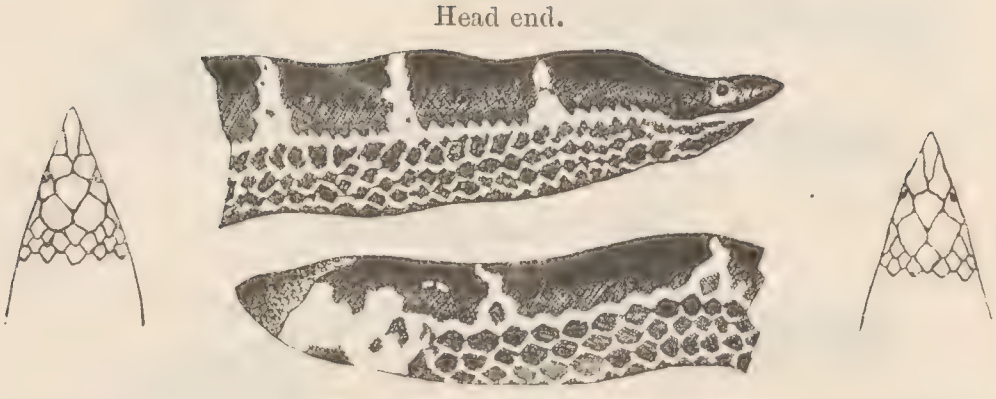
* Placed on a bench in the east alcove.

† *B. cæruleus* has only been recorded from Jaffna.

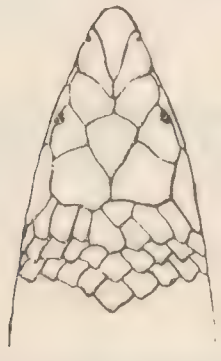


Colour variations of *Rhinophis blythii*.

UROPELTIDÆ.



Rhinophis trevelyanus.



Head-shields of *Uropeltis grandis.*

or estuarine snake (*Cerberus rhynchops*,) which, like another fresh-water snake, *Tropidonotus plumbicolor*, has a viperine look but is quite harmless; and a rare fresh-water snake, *Gerardia prevostiana*, from the Kelani river, caught twenty years ago. Over the seventh case will be found a large specimen of the common Rat-snake (*Zamenis mucosus*); another snake which attains a length of five feet and a wide girth is *Dipsas forstenii*, of which only a half-sized example is shown. This snake is represented in Ceylon by two varieties, the typical variety, brown with angular oblique black bars, and the red variety, uniformly rich reddish-chocolate above without black bars, paler roseate flush below; a fine example obtained from Nambapana in September, 1904, is shown. It is called locally the Lé-polonga (Blood-polonga), and is reputed poisonous.

On a bench in the fish-gallery or east alcove there are skeletons of the python, of a sea snake, *Distira stokesii*, from the Pearl Banks, presented by Captain Donnan, and of a monitor lizard.

The remaining smaller snakes and lizards are placed over table cases near the western end of the gallery. These are chiefly interesting on account of the relatively large number of endemic forms, species of lizards of the genera *Ceratophora*, *Lyriocephalus*, *Otocryptis*, *Cophotis*, and *Acontias* being peculiar to the Island; examples of these are shown over Table Case XVII. Endemic species of snakes belonging to the genera *Aspidura* and *Rhinophis*, as well as specimens of *Lycodon aulicus*, to which reference has been made above, are exhibited over Case XVIII. The snake *Cylindrophis maculatus* is also a peculiar species, and is the one to which the native name "Depat-naya" (two-headed snake) is specially applied, though the term is equally applicable to *Rhinophis* and allied snakes. The hinder end of the body of these snakes is truncated, and bears superficial resemblance to a head. The colour, yellowish on dark brown, varies considerably, especially in the case of *Rhinophis blythii* (see illustrations).

The **giant tortoise** from Aldabra, *Testudo elephantina*, shown on the far side of the Peacock Case, does not belong to Ceylon, but lived here for many years in the grounds of the villa called "Uplands" in Mutwal, near Colombo. It was found here at the time of the British occupation in 1796, and had become thoroughly acclimatized.* It died in March, 1894.

A striking display of large marine turtles caught off the coast of Ceylon is to be seen under the large platform in the eastern or

* The Hog-deer (*Cervus porcinus*), of which two living specimens are shown in the grounds, is another example of an acclimatized animal, introduced from India during the Dutch administration into the Kalutara District, where it now occurs.

fish alcove. The edible turtle, *Chelone mydas*, attaining a length of four feet, is herbivorous.* The loggerhead turtle, *Thalassochelys caretta*, is obtained by harpooning and netting by the natives of Iranativu and elsewhere off the coast; it is carnivorous, feeding on crustaceans and molluscs. The leathery turtle, *Dermochelys coriacea*, was presented by C. H. de Soysa, Esq.; it is not common. Finally, a specimen of the tortoise-shell turtle, *Chelone imbricata*, and a young edible turtle, are shown in small tanks on either side of the staircase.

Some of the Amphibians of Ceylon are shown over Table Case IV., next to the Eagle Group. The large bull-frog is *Rana tigrina*, the common toad *Bufo melanostictus*. The common frog of the Colombo lake is *Rana hexadactyla*. The tree-frog,† *Ixalus adspersus*, peculiar to Ceylon, has been found at Pattipola, 6,200 feet, and is one of the rarest frogs existing. The climbing frogs of the genus *Rhacophorus* attach their foam-like nests to the leaves of shrubs and trees overhanging water, into which the tadpoles drop when they hatch. The most singular batrachian occurring in the hills of Ceylon above 2,000 or 3,000 feet is the worm-like, legless "salamander,"‡ *Ichthyophis glutinosus*. It burrows in soft mud; the female lays eggs of large size, and coils round the clump of eggs until they are hatched. The larvæ are aquatic, and are provided with a respiratory orifice or *spiraculum* on each side of the neck. The development has been worked out by two Swiss naturalists, Drs. Fritz and Paul Sarasin.

FISHES.

A large series of sharks and bony fishes is shown in the eastern alcove of the gallery. The largest and rarest is the huge shark which rests upon the platform along the centre of the room. This is a specimen of the Basking Shark (*Rhinodon typicus*), 23 feet long, caught at Moratuwa in 1883. This species has also been obtained off the Seychelles and the Cape of Good Hope; it was first recorded from the west coast of Ceylon by Mr. Amyrald Haly, the former Director of the Colombo Museum. In spite of its bulk the specimen shown is not full-size, and it is a harmless shark. It is regarded as one of the gems of the entire collection.

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* *Chelonia virgata* is synonymous with *Chelone mydas* [Boulenger].

† The true tree-frogs of the family Hylidæ are not represented in Ceylon.

‡ The tailed batrachians (newts and salamanders) form the order Urodela, which is unrepresented in Ceylon; the tailless batrachians (frogs and toads) form the order Anura; the legless batrachians or the cæcilians belong to the order Apoda.

NEST OF CLIMBING FROG. (COLOMBO.)

(*Rhacophorus maculatus.*)

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Unfortunately the form of the mouth is lost in the mounted specimen; when fresh the width of the mouth was 3 feet, but shrunk to 1 ft. 11 in. in drying. "When fresh the lower jaw was quite straight and flat.....and considerably in advance of the upper, so that the band of teeth in the lower jaw was quite uncovered."

The teeth in both jaws consisted of eleven (in the upper) to fourteen (in the lower) rows of minute, sharp, recurved denticles, of equal size, 2 millimeters long.* Another specimen, 18 feet long, was taken at Negombo in March, 1889, and was presented to the British Museum by the Government of Ceylon. In the same year one was caught, 22 feet long, off Madras, and is now exhibited in the Madras Museum.

At the end of the platform three other stuffed sharks are lying on their sides; that to the right of the Rhinodon is a fine specimen of the Hammer-headed Shark (*Zygæna malleus*), characterized by the shape of the rostrum, which is drawn out sideways into two hammer-shaped lobes, at the ends of which are the eyes with the nostrils near to the eyes; that to the left of the Rhinodon is the Tiger Shark or Tope (*Galeocerdo rayneri*), distinguished by its formidable notched teeth. This shark is said to be exceedingly fierce and very cunning, swelling itself out so as to appear like a floating mass of animal substance, in order to decoy its prey. Behind the Rhinodon there lies another shark, 9 feet long, named *Ginglymostoma mülleri*, Günther. Below the front window, at the back of the Rhinodon, is another interesting shark, *Alopecias*, or *Alopias vulpes*, the Fox or Thresher Shark, which was rescued by Mr. Haly from the Colombo market in February, 1884.‡

Against the adjoining north window are two sharks of the saw-fish family; the larger specimen is an example of *Pristis cuspidatus*, the smaller is *Pristis perrotteti*. These differ from one another in the position of the first dorsal fin and in the armature of the rostrum, a considerable portion of the base of which is destitute of teeth in *P. cuspidatus*.

A few more sharks are preserved in spirits in the adjacent wall case. The skates and rays next invite attention. Over the wall cases beside the north window are two examples of a large Sting Ray (*Trygon uarnak*), and in the bottom shelf of the left wall case is a Thorny-backed Ray, said to be common in the Indian Ocean, called *Urogymnus asperrimus*. In a trough on the

* *Cf.* A. Haly. Occurrence of *Rhinodon typicus*, Smith, on the West Coast of Ceylon. Ann. Nat. Hist. (fifth series), vol. XII., 1883, pp. 48-49.

† *Cf.* Day, F. Faun. Brit. Ind., Fishes, vol. I., p. 33.

‡ *Cf.* Note by A. Haly in the "Taprobanian," 1886, vol. I., p. 167.

south-east verandah is a young specimen of the "Two-horned" Skate (*Dicerobatus eregoodoo*), exhibited with the lower side up displaying the gill-clefts with the gills showing through. In another trough on the opposite north-east verandah is another well-preserved Sting Ray of the species *Trygon sephen*, and near to this is a young Beaked Ray (*Aëtobatis narinari*). The skates and rays feed largely upon crabs and molluscs.

The fairly numerous specimens of Teleostean or bony fishes which are exhibited in the wall cases are somewhat remarkable on account of the well-preserved colour markings, which in many cases have retained their freshness after the lapse of several years, in a gum and glycerine mixture adopted by Mr. Haly. Against the window beside the Thresher Shark is a good example of the Swordfish (*Histiophorus gladius*). The large stuffed fish in the bottom shelf of the adjoining wall case is a Wrasse (Labridæ). The parrot wrasses, fishes of brilliant colours, feeding in the neighbourhood of coral reefs at Galle, for example, with parrot-like beak consisting of teeth soldered together, belong to the genus *Pseudoscarus* of the Wrasse family. The "Red Mullet" of the Colombo market is *Serranus sonnerati*, of the Perch family. The Seirfish, the staple fish food of Colombo, belongs to the Mackerel family (Scombridæ), and is named *Cybium guttatum*.*

The jumping fishes to be seen about the rocks at Mount Lavinia and Galle are blennies of the genus *Salarias;* and the mud-skippers of Negombo are gobies of the genus *Periophthalmus*.

The principal fresh-water fishes of Ceylon are the Carps (Cyprinidæ), including the Indian game fish called the Mahseer (*Barbus tor*), the Ophiocephali, tank-fishes, the Labyrinthici or "climbing perches" (*Anabas scandens* and *Polyacanthus signatus*), and the Catfishes (Siluridæ). One genus of catfishes, *Arius*, called "anguluwa" in Sinhalese, occurring at Panadure, Kalutara, and elsewhere, has the remarkable peculiarity that the males carry the eggs, 15–20 in number, in their mouths until they are hatched.

INSECTS.

The Lepidoptera (butterflies and moths) are shown in eight table cases placed near the Eagle and Peacock Groups.

The Moths or Nocturnal Lepidoptera commence in Table Case II. with the family Saturniidæ, the caterpillars of which spin silken cocoons in which they pupate and from which they emerge in the adult or imago phase of their life-history. This family comprises the largest moths found in Ceylon, namely, the Lunar Moth

*Not exhibited. There is an extensive tunny fishery (*Thynnus thunnina*) off Balapitiya during the north-east monsoon, and the fish are daily sent to Colombo.

Salarias Andersoni.

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(*Actias selene*), green with a dark bordered whitish circle in the centre of each wing and with long swallow-tailed hind wings; the Atlas Moth (*Attacus atlas*), deep chocolate with oblique translucent windows in each wing; the Tussur Silk Moth (*Antheræa paphia*), rich yellow with a transparent round window in each wing. The Bombycidæ and Eupterotidæ complete this side of the case. The other side contains the Sphingidæ, which include among many species the Death's Head Moths of the genus *Acherontia*, the caterpillars of which stridulate, uttering a clicking sound by rubbing their jaws together; and the Clear-wing Moths (*Cephonodes hylas*), which sometimes become a pest in cultivated districts. All the caterpillars of this family are provided with a horn-like appendage on the back near the end of the abdomen.

Case III. opens with the Notodontidæ and closes with the Arctiidæ. The Syntomidæ, which follow the Notodontidæ, include some very common species, while the Zygænidæ bear the appearance of butterflies, which they further resemble by their habit of flying about during the day.

Case IV. continues the Arctiidæ and commences the extensive family of the Noctuidæ, the latter being continued in Case V., which contains several handsome moths, *e.g.*, *Phyllodes consobrina* with leaf-shaped forewings, and *Ophideres salaminia*, which seems to mimic a Sphingid moth.

Case VI. contains Uraniidæ, Epiplemidæ, Geometridæ, and the commencement of the Pyralidæ or shining moths. Case VII. continues the Pyralidæ and concludes with a few Microlepidoptera of the family Tineidæ. On the other side of this case are shown some dragon-flies (Neuroptera).

Finally, Cases IX. and X., placed alongside in the central space, are devoted to the butterflies, which include a fine series of the Leaf Butterfly, *Kallima philarchus*.

In addition to the exhibited Lepidoptera the Museum possesses a large duplicate students' collection containing many rare species not shown in the cases. This may be inspected on application. There are, on the other hand, many moths recorded from Ceylon which have not yet found their way to the Museum collection.

The other orders of the insects of Ceylon have not been worked out so thoroughly as the Lepidoptera. They are represented in the table cases near the west end of the gallery, and are subject to re-arrangement. Orthoptera (locusts, stick insects, cockroaches, and mantids) and Coccidæ (mealy bugs) are shown in Cases XV. and XVI; Coleoptera in Case XVII.; Hymenoptera (ants, bees, and wasps), with a couple of black flies mimicking a wasp and a bee respectively, in Case XVIII.

The Museum is largely indebted for many specimens in the Insect Department to Mr. E. E. Green, the Government Entomologist, and to Messrs. F. M. Mackwood and O. S. Wickwar, who have also devoted much time to the arrangement of the duplicate collections of Butterflies, Moths, and Hymenoptera.

CRUSTACEANS AND MOLLUSCS.

Some Crustaceans (crabs, hermit crabs, prawns, barnacles) will be found among the table cases, chiefly on the tops of the cases. Marine Shells and Land Shells are contained in the table cases surrounding the central group. The marine shells of Ceylon are not remarkable for their exceptional variety and abundance. Ceylon follows far behind many other localities of the Indo-Pacific Region in the richness of its Marine Molluscan Fauna, but a sufficient compensation is afforded by the presence of the celebrated pearl banks.

On the other hand, the land shells of Ceylon are highly peculiar, and comprise many endemic species. The largest snails of the Island belong to a genus, *Acavus*, which is confined to Ceylon. Mr. Oliver Collett, F.R.M.S., who lived for some years at Ambagamuwa, was a great collector and connoisseur of the land-shells of Ceylon, and published three "Contributions to Ceylon Malacology" in the Journal of the Ceylon Branch of the Royal Asiatic Society (vols. XV.–XVI., 1897–1900). On his death, which occurred prematurely in 1902, his collection was purchased by the Government of Ceylon for the Colombo Museum and forms a valuable students' collection, which can be viewed on application. It contains several species still unnamed.

PEARL BANKS AND CORAL REEFS.

A number of specimens in Table Cases I. and VIII., some of which were presented long ago by Captain Donnan, many more having been added recently by Mr. James Hornell, Marine Biologist and Inspector of Pearl Banks, illustrate the natural history of the banks or paars which afford anchorage to the pearl oyster. Prior to the year 1903 there had been no pearl fishery for twelve years, and in 1902 a special mission, consisting of Professor W. A. Herdman, F.R.S., assisted by Mr. James Hornell, was appointed to report on the Pearl Oyster Fisheries of the Gulf of Mannar. "The animal (*Margaritifera vulgaris*, Schum. = *Avicula fucata*, Gould) is not a true oyster, but belongs to the family Aviculidæ, and is therefore more nearly related to the Mussels (*Mytilus*) than to the Oysters (*Ostrea*) of our British seas. One very notable character of great practical importance, in which it differs from

Ostrea, is that the pearl oyster, like our common mussels, has a 'byssus' or bundle of tough threads by which it can attach itself to rocks or other foreign objects." *

The collection shows pearl oysters from several paars in various stages of growth, and other organisms, corals, pennatulids, sponges, sea urchins, &c., which also grow on the pearl banks in association with the pearl oysters. Of special interest are the specimens prepared in spirits showing pearls *in situ*.

Large specimens of stone corals (Madreporaria), sea shrubs (Gorgonacea), black corals (Antipatharia), and leathery corals (Alcyonacea) from Galle and the Maldive Islands are exhibited in wall cases in the fish alcove and on the south verandah. Those from the Maldive Islands were presented by Mr. J. Stanley Gardiner, M.A., who organized an expedition for the investigation of the coral atolls of the Maldives in the years 1899–1900.†

The dried corals which are exhibited are the basal and axial skeletons secreted by the soft parts of the living coral polyps. These form large colonies by a peculiar process of budding and branching, and deposit the mineral substances which they have absorbed from the sea water so as to form the wonderful growths which remain after the living tissues have been removed.

The Madreporaria are the reef-building corals forming extensive reefs at Galle and off Jaffna, and especially at the Maldive Islands, which are themselves partially elevated coral reefs. The pearl banks are not coral reefs, but sandbanks, formed of sandstone and concretions upon which isolated corals grow without forming reefs.

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* *Cf.* Report to the Government of Ceylon on the Pearl Oyster Fisheries of the Gulf of Mannar, by W. A. Herdman, D.Sc., F.R.S., with supplementary reports upon the Marine Biology of Ceylon by other naturalists. Published by the Royal Society, Part I., London, 1903. Professor Herdman and Mr. Hornell arrived in Ceylon in January, 1902, and the former left in the following April. Since then the work has been carried on locally by Mr. Hornell.

§ The Fauna and Geography of the Maldive and Laccadive Archipelagoes. Edited by J. Stanely Gardiner. Vols. I. and II., 1901–1905 (Cambridge University Press).

THE ROCKS AND MINERALS OF CEYLON.

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I.—ROCKS.

The rocks of Ceylon are known as **Granulites,** or, using the term in its widest sense, as Gneisses; they belong to the same series as that which Mr. Holland has named in Southern India the **Charnockite Series.** The rocks are crystalline and show conspicuous mineral banding (foliation), and are very varied in mineral composition. Rocks of igneous origin form by far the greater part of the Charnockite Series in Ceylon, although it is possible that amongst these rocks there are some of sedimentary origin now highly metamorphosed and incorporated with the others. The bedded appearance so suggestive of sedimentary rocks is in this respect deceptive, and is due to the banded structure produced by flowing movements in the heterogeneous magma during its consolidation. No fossils occur in any of the crystalline rocks.

The most characteristic types of rock exhibited include **granular quartz rock,** consisting essentially of quartz, but often with minute quantities of felspar and garnet; **leptynites,** composed of quartz and felspar, and very often containing an abundance of garnet; typical **charnockite,** essentially composed of felspar quartz and hypersthene; **pyroxene** granulites, characterized by the presence of pyroxene (hypersthene or augite or both) with felspar (usually triclinic) and with or without orthoclase, quartz, or garnet; amongst these are rocks with the mineral composition of **norites, diorites,** and **gabbros**; there are also more basic types consisting almost entirely of pyroxene, amphibole, and garnet; these dark heavy rocks frequently occur as lenticular bands and inclusions in the more acid types. Coarse-grained pegmatites of an intrusive character are found in dykes and veins crossing or parallel to the foliation of the other rocks; in them the minerals quartz, orthoclase, mica, and hornblende are most characteristic; the quartz and felspar are often intergrown as in **graphic granite.**

The **crystalline limestones** are found in wide or narrow bands interbedded with the other rocks, often separated from them by a zone of heavy dark green rocks composed essentially of pyroxene and mica, often with spinel. The limestones

themselves vary much in purity and in dolomitic character; the minerals most frequently occurring and indeed nearly always present are forsterite and phlogopite; graphite is frequently abundant in small flakes; other accessory minerals include pyrite, blue apatite, spinel, amphibole, chondrodite, scapolite, &c. Of inclusions in the limestones there are (*a*) aggregates of the characteristic accessory minerals; (*b*) inclusions of rocks indistinguishable from the pyroxene granulites except for the usual presence of scapolite and sphene.

Certain rocks composed essentially of pyroxene with scapolite, amphibole, mica, calcite, and sphene occur sparingly in bands interbedded with the other rocks; separating limestone from granulite; or as inclusions in the limestones.

The Galle Group.—A group of rocks allied to these but distinguished by the presence of wollastonite is found at Galle. These rocks include types composed of pyroxene, scapolite, sphene, wollastonite, and graphite, and all transitions from these to rocks composed of quartz and felspars. There are also remarkably coarse dykes composed essentially of orthoclase, quartz, and wollastonite, crossing the foliation; the individuals of wollastonite, moulding the idiomorphic crystals of quartz and orthoclase, are sometimes as much as 3 feet in length.

The name **Balangoda group** is given to a series of granitic rocks, intrusive in the Charnockite Series or granulites; the granites occur in dykes and lenticular masses, the best exposures so far known being in the Balangoda district. The principal types include zircon granite, allanite-granite or pegmatite, magnetite granite, and granite without accessory minerals. But although not yet discovered *in situ* (except thorianite, which occurred very sparingly in a pegmatite vein at Gampola, and ilmenite, which is common in several types), the following additional minerals are almost certainly derived from rocks of the Balangoda group: baddeleyite, beryl, cassiterite, chrysoberyl, fergusonite, geikielite, ilmenite, rutile, some spinels, thorianite, thorite, topaz, and some tourmaline.

Rocks which are alteration products of those already mentioned include bands of **chert** (opaline chalcedonic rock), which usually occurs replacing the carbonates of the crystalline limestones, minerals such as spinel and graphite remaining in the chert unaltered. **Laterite** (cabook) is a typical decomposition product of the granulites, and is of interest on account of its use as a building material, and on account of its chemical composition, consisting largely of aluminium hydrate. Various **clays**, including **kaolin** (china clay, "kirimeti," "makul") are derived from the

decomposition of the granulites, especially from their felspathic elements.

Volcanic rocks are very sparingly represented in Ceylon. A typical **dolerite** (probably occurring as a dyke) from Kallodai, Eastern Province, is represented in the collection. A few other dykes are said to have been met with in Ceylon. No lavas or tuffs occur, and, with the exception of a few hot springs, no signs of volcanic activity are found. Denudation has been so long at work that only the most deep-seated rocks are now exposed at the surface. Of sedimentary rocks, we have (*a*) **river gravels, sands,** and alluvial **clays** (used for brick making) deposited by rivers. In the gravels are found the gems which have been derived from the crystalline rocks ; many have not yet been found *in situ*. (*b*) **Marine deposits,** including coralline raised beaches, blown sand, &c. Fossil shells and corals are abundant in the raised beaches which are found all round the coast and often some little way inland, but never very far above the present level of the sea.

II.—MINERALS.

Before proceeding to refer in systematic order to the nature and mode of occurrence of particular minerals it will be useful to consider briefly their nature and mode of formation. Regarded from this point of view the minerals of Ceylon fall into three main groups, which are not, however, separated from each other by any rigid line of demarcation :—

A.—Minerals composing or associated with the crystalline rocks.

B.—Vein minerals.

C.—Minerals which are alteration products of other minerals and rocks.

The first class includes those whose origin is for the most part directly igneous (*i.e.*, the majority of Ceylonese minerals), and which occur as original minerals in the granulites and crystalline limestones. Many of these have crystallized from an actually molten or viscous magma, others perhaps from masses of rocks existing merely in a state akin to fusion, some being developed as the result of contact interaction between the limestones and granulites when both possessed a high temperature, whilst others forming pegmatite veins may even have crystallized from heated vapours or liquids saturated with mineral matter. When suitable conditions prevail, these minerals each assume definite and characteristic crystalline forms ; this has, however, rarely been the case in the granulites themselves, where an irregular "granulitic" structure usually prevails ; in the crystalline limestones, however,

PLUMBAGO MINE.

To face page 53.]

the accessory minerals have more often been able to crystallize in their own forms ; for an example see Fig. 1, an octahedral crystal of spinel. Such "idiomorphic" crystals are commonly known in Ceylon as "devil-cut."

It is interesting to note that of all the gem minerals so famous in Ceylon few have yet been found *in situ*. New records of the occurrence of these minerals in their parent rock is much desired. Nearly all the gems of Ceylon, moonstone excepted, are obtained from the river gravels of the Ratnapura, Rakwana, Galle, and Morawak Korale Districts ; but some are found in superficial deposits whose situation on hill slopes shows that the contained minerals must occur *in situ* at no very distant spot.

Fig 1.—Octahedral crystal of spinel.

Minerals of the second class include the greater part of the graphite of Ceylon and perhaps a considerable part of the mica. Associated with the graphite are often found some of the minerals characteristic of the granulites, such as quartz and felspar. True veins of pure quartz are rarely met with in Ceylon. Minerals of the third class include the deposits of iron ore (limonite) and manganese ore (psilomelane), which are everywhere common as decomposition products of the granulites ; and also the minerals hydrargillite and limonite composing laterite.

A few minerals occur in Ceylon which have not been found elsewhere ; these are thorianite, geikielite, and serendibite. The mineral baddeleyite was first found in Ceylon, but has since been met with in Brazil.

Further notes on the more important minerals will be found below, where a list of all the minerals known to occur in Ceylon is given.

Graphite, C.—Graphite or plumbago is the most important mineral product of Ceylon. Its composition is pure carbon. It is found in veins and nests in the crystalline rocks, occurring often

in a fibrous or flaky form, the flakes being arranged at right angles to the wall of the vein (see Fig. 2). The veins vary in width from less than an eighth of an inch to several feet. Some are found to follow the foliation planes of the various rocks, others cross them and ramify in all directions. Much smaller quantities of graphite occur as flakes in many of the granulites and in the crystalline limestones, when it usually forms small tabular six-sided crystals with well-developed basal cleavage. In these cases the graphite behaves like the other accessory minerals, and there is no reason to suppose that it has been subsequently introduced.

Fig. 2.—Vein graphite surrounding a portion of included matrix (white leptynite).

It is clear, however, that the graphite occurring in veins has been deposited at a time posterior to the consolidation of the granulites. The veins are often of the most typical character. Usually they consist of pure graphite (sometimes there is evidence of more than one period of deposition in a zoned structure of the vein) ; sometimes the vein shows a central zone of quartz or pyrite with graphite on either hand, sometimes the graphite is more irregularly associated with minerals such as felspar quartz and mica and with fragments of the surrounding rock.

Metamorphism of the surrounding rocks near the veins is found only on a very small scale ; the rock surfaces in immediate contact with the veins are not impregnated with scales and flakes of graphite to a greater depth than half an inch. Nor do we find that the quartz and other minerals associated with the graphite veins

are filled with disseminated graphite; the latter occurs only in strings or scales occupying obvious cavities or cracks in the quartz. It seems that the deposition of graphite has been subsequent to the formation of the pegmatite veins, though following the same or similar paths in some cases.

As regards the source of the graphite, we see at once that its presence cannot be ascribed to the metamorphism of beds of coal or other carbonaceous deposits, and indeed that the graphite can have had no direct organic source and is most probably of entirely inorganic origin. Like other minerals found in veins, it must have been deposited from vapours or liquids saturated with mineral (in this case carboniferous) matter; for we cannot suppose that the graphite was introduced in the form of dykes of molten carbon.

Sulphur, S.—Occurs as a decomposition product of pyrite in small quantities.

Gold, Au.—Small quantities of native gold are of rare occurrence in streams, sands, and alluvial deposits, but there is little prospect of its ever becoming of commercial importance.

Salt, NaCl.—Obtained by the evaporation of sea water in natural and artificial lakes, known as "lewaya."

Cinnabar, HgS.

Pyrite, FeS_2.—Common as an accessory mineral in granulites and crystalline limestones.

Marcasite, FeS_2.

Pyrrhotite, $Fe_{11}S_{12}$.—Occasionally as an accessory mineral in crystalline limestones and in charnockite.

Ice, H_2O.—Frost is sometimes experienced in the hills.

Fig 3.—Corundum.

Corundum, Al_2O_3.—Corundum is the most important of the gem minerals of Ceylon. When red it is known as ruby; when blue as sapphire; when purple as oriental amethyst; when yellow as oriental topaz; colourless varieties are also found. The peculiar

character of "star sapphires" is due to the presence of regularly distributed minute inclusions arranged along the lines of growth, producing the appearance known as "silk;" a six-rayed star is seen when the crystal is viewed in the direction of its vertical axis. Coarser varieties of corundum are used as emery, for which purpose a good deal is obtained in Southern India. Corundum is found in the river gravels of Ceylon in more or less rounded and waterworn six-sided crystals, which are either prismatic or doubly pyramidal in character.

Only two localities are known in Ceylon where corundum occurs in the parent rock. In one case (Talatu-oya) blue hexagonal crystals occurred in a narrow band of rock composed essentially of orthoclase, microperthite, and oligoclase. In the other (Haldummulla) violet or purplish hexagonal crystals are found in a corundum-sillimanite rock (of which a large specimen is exhibited), but not actually *in situ*.

In Southern India corundum occurs (*a*) in felspathic rocks as a direct product of the magma; (*b*) in certain aluminous rocks, probably as the result of contact metamorphism. Specimens of these rocks are shown in the collection. In Burma rubies are found in the crystalline limestones, which in other respects closely resemble those of Ceylon.

Hematite, Fe_2O_3.—Less usual than limonite as an iron ore derived from the decomposition of the granulitic rocks.

Limonite, $2Fe_2O_3 3H_2O$.—The common ore of iron in Ceylon, and formerly extensively worked. Almost always found as a product of the decomposition of the granulites.

Hydrargillite, $Al_2O_3 3H_2O$.—Forms, with limonite, the greater part of ordinary laterite (cabook).

Cassiterite, SnO_2.

Rutile, TiO_2.

Thorianite, $ThO_2 + UO_3$. — This newly-discovered mineral, peculiar to Ceylon, is of great commercial importance owing to the use of thoria in the manufacture of incandescent gas mantles. It occurs in very heavy black cubic crystals at Bambarabotuwa, where over a ton has been obtained. It is valued at £600 sterling per ton. It is of great scientific interest too, on account of its chemical composition, one or more new elements being possibly present; it contains also a large amount of occluded helium. Though radio-active, there is no more than a trace of radium present.

Baddeleyite, ZrO_2.

Quartz, SiO_2.—Very abundant throughout the Charnockite Series. The purple variety is amethyst. Drusy groups from

cavities in crystalline limestone at Welimada. Doubly terminated crystals not rare in gem washings.

Fig. 4 shows the ordinary hexagonal prisms of quartz.

Fig. 4.—Quartz hexagonal prisms.

Chert, SiO_2.—An opaline chalcedonic rock usually replacing crystalline limestone.

Chalcedony, SiO_2.

Opal, $SiO_2 + H_2O$.—In some cases a rock consisting entirely of common opal is found with the less pure cherty varieties.

Psilomelane, $MnO + MnO_2H_2O$.—Commonly associated with limonite and hematite in veins and aggregates resulting from the decomposition of the granulites.

Spinel, $(MgFe)OAl_2O_3$.—Blue, green, and red spinels (especially the latter, known as Balas ruby) are used as gems. Small well-formed octahedra (see Fig. 1, page 53) of spinel, usually pink, are common in the crystalline limestones. Green spinel occasionally occurs in granulites, and frequently in the heavy dark green rocks associated with junctions of limestone and granulite. The gem spinels are obtained from the gravels, but are probably derived from the crystalline limestones.

Magnetite, $FeOFe_2O_3$.—Common as an accessory mineral in the granulites; also in limestones.

Chromite, $FeOCr_2O_3$.

Chrysoberyl, $BeOAl_2O_3$.—Includes cat's-eye and alexandrite. This important gem stone sometimes occurs in large individuals, exhibiting characteristic twinning. The beautiful chatoyance of the cat's-eye is perhaps due to the presence of fine tubular cavities arranged symmetrically in the crystal. (The much less valuable

"coast" or quartz cat's-eye is of a quite different character, consisting of quartz with included silky fibres of asbestos.) The green alexandrite appears red by transmitted light and generally also by candle light, but green by reflected light or daylight.

Calcite, $CaCO_3$.—In the crystalline limestones.

Dolomite $(CaMg)CO_3$.—In the crystalline limestone; sometimes forming with calcite parallel or ramifying intergrowths.

Forsterite, Mg_2SiO_4.—This colourless mineral is characteristic of the crystalline limestones, where it is extremely abundant. The individuals are usually small. An unusually large crystal in limestone is exhibited; also some very flattened crystals of a superficially dark colour. Incipient superficial decomposition often gives a dark colour to the crystals.

Clinohumite, $Mg_7(MgF)_2(SiO_4)_4$.—This beautiful yellow mineral is of rare occurrence in the crystalline limestones.

Pyroxenes:

(1) *Hypersthene* $(FeMg)SiO_3$.—One of the most characteristic minerals of the Charnockite Series.

(2) *Diopside* $(CaMg)SiO_3$.—A colourless to pale green pyroxene characteristic of the crystalline limestones.

(3) *Manganhedenbergite*, $Ca(FeMn(SiO_3)_2$.—Characteristic of the Galle group, and probably common in similar rocks elsewhere.

(4) *Augite*, $CaMgFe(SiO_3)_2 + MgFe(AlFe)_2(SiO_3)_2$. — Characteristic of many pyroxene granulites.

(5) *Wollastonite*, $CaSiO_3$.—Characteristic of the rocks of Galle, in which it occurs disseminated, and also in very large individuals in coarse pegmatite veins. It has not yet been found elsewhere in Ceylon.

Amphiboles:

(1) *Tremolite*, $CaMg_3(SiO_3)_4$.—Includes colourless and pale amphiboles associated with the crystalline limestones.

(2) *Horneblende*, $Ca(MgFe)_3(SiO_3)_4$ &c.—Includes dark amphiboles occurring in the crystalline limestones and the dark green amphiboles characteristic of many of the more basic varieties or granulites and of contact zones.

Ilmenite, $FeTiO_3$.—Of widespread occurrence; the commonest ingredient of *námbu* and black sand. One exceptional and very large specimen is shown.

Geikielite, $MgTiO_3$.—Not known except in Ceylon, where it was found in gem refuse.

Titanite (*Sphene*), $CaTiSiO_5$.—Characteristic of the rocks of the Galle group; common in junction rocks, &c.

Talc (*Steatite*), $H_2Mg_3(SiO_3)_4$.—To be distinguished from mica. Rare as an accessory mineral in crystalline limestones.

Serpentine, $H_4Mg_3Si_2O_9$.—Not infrequent as a decomposition product of forsterite.

Apophyllite, $(HK)_2Ca(SiO_3)_2H_2O$.

Topaz, $(AlF)_2SiO_4$.—Commonly found in gem gravels; yellow, colourless, or pink, the latter variety known as king topaz. The colourless varieties are wrongly known as water sapphires. The pale greenish-blue varieties are cut as aquamarine. Not met with *in situ*.

Andalusite, $Al(AlO)SiO_4$.

Kyanite, $(AlO)_2SiO_3$.—Has only been found in dredgings made by Professor Herdman off the coast of Ceylon.

Sillimanite, Al_2SiO_5.—Very rarely in good crystals in gem gravels. Sillimanite is in some districts a common constituent of the garnetiferous leptynites, the rocks then resembling the khondalites of Southern India, of which specimens are exhibited. Fine coarse sillimanite rocks occur near Haldummulla, the sillimanite being disposed in sheaf-like and radiating aggregates. The associated minerals are corundum, garnet, orthoclase-microperthite, ilmenite, and rutile. See also under Corundum.

Kaolinite (*China Clay*), $H_4Al_2Si_2O_9$.—Common as a decomposition product of orthoclase.

Felspars:

(1) *Orthoclase*, $KAlSi_3O_8$ affords the well-known moonstone; it occurs in large but well-cleaved crystals in certain acid granulites associated with crystalline limestones in the Dumbara district, Central Province. Various pegmatites also, consisting of quartz and orthoclase, yield moonstone of a poor quality. Large individuals of idiomorphic orthoclase occur in pegmatite veins at Galle. An intergrowth of orthoclase with albite is the most usual felspar of the less basic granulites. The silvery sheen so characteristic of moonstone is probably the result of the presence of excessively minute inclusions of kaolin, the products of incipient decomposition. The bluish-white opalescence of moonstone is best seen when the crystal is viewed in a direction at right angles to the basal plane, *i.e.*, when regarding one of the planes of easy cleavage; the stone should always be so cut that the flat base of the finished cabochon gem is parallel to this surface, in order that the opalescence may be central and as conspicuous as possible.

(2) *Plagioclase* (*Lime-Soda Felspars*).—These are commonly characteristic of many of the granulites, but are rarely of large size. A fine blue opalescence has occasionally been observed in the plagioclase felspars, but none of size suitable for yielding gems have been found.

(3) *Microcline*, $KAlSi_3O_8$.—Rarer than orthoclase in the granulites.

Micas.—Ceylonese micas are of some importance from a commercial point of view. They include muscovite, biotite, and phlogopite :—

(1) *Muscovite*, $H_2KAl_3(SiO_4)_3$ occurs but sparingly in Ceylon, and not in crystals large or flawless enough to be of commercial value.

(2) *Biotite*, $(KH)_2(MgFe)_2(AlFe)_2(SiO_4)_3$ is chiefly found in small crystals as a microscopic constituent of various rocks belonging to the Charnockite Series ; but a part of vein mica also belongs to biotite.

(3) *Phlogopite*, $(K,H,Mg,F)_3Mg_3Al(SiO_4)_3$ is by far the most important of Ceylonese micas. Minute pale or golden crystals are almost always common in the crystalline limestones. Larger mica crystals occur in veins and bands associated usually with junction of granulite and crystalline limestone. These micas are rarely colourless, being more usually brown, reddish, bottle-green, or amber-coloured. The largest crystals found have been two or three feet in diameter. The veins are usually one or two feet in width, and are composed of numerous "books" or crystals of mica which are generally more or less idiomorphic, having a clear-cut hexagonal outline. Mica is used for the peepholes of stoves, for lamp chimneys, and very largely for electrical appliances, &c.; comminuted mica dust is of use as a non-conducting packing. Mica has long been used in the East for ornamental purposes, also for medicine. Fine crystals of mica from the Kandy District are exhibited.

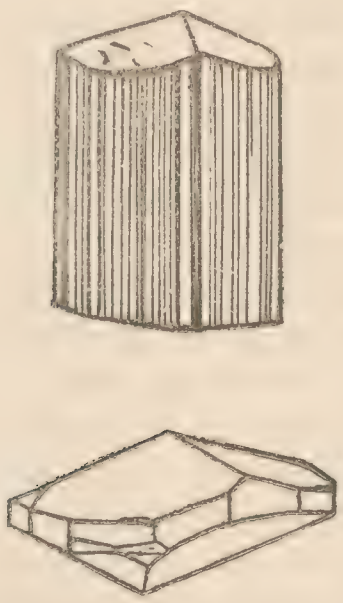

Fig. 5.—Tourmaline.

Tourmaline.—A borosilicate of alumina with magnesia iron and alkalis. Black varieties associated with quartz are not uncommon.

The greater part of the *toramalli* of gemmers belongs properly to zircon.

Serendibite.—A borosilicate of alumina and lime with magnesia and alkalis. Found only in Ceylon. In small crystals in diopside rock at the junction of limestone and granulite. Dumbara district, Central Province.

Scapolite, $Ca_4Al_6Si_6O_{25}Na_4Al_3Si_9O_{24}Cl$.—Abundant in the wollastonite-scapolite gneisses of Galle; common in limestone-granulite junction rocks. Sometimes an accessory mineral in limestones.

Stilbite, $(Na_2Ca)Al_2Si_6O_{16}6H_2O$.—In minute crystals; from Nilhene, near Baddegama, Southern Province.

Zoisite, $Ca_2Al_2(AlOH)(SiO_4)_3$.

Allanite, $(CaFe)_2(AlCeFe)_2(AlOH)(SiO_4)_3$.—In coarse granitic dykes near Balangoda.

Beryl, $Be_3Al_2(SiO_3)_6$.—The pale varieties of emerald known as aquamarine are abundant in gem gravels. Ceylon specimens with the true emerald colour have been very rarely met with.

Cordierite (*Iolite*), $(MgFe)_4Al_4Si_5O_{18}$.—In rolled crystals known as water sapphire. Many stones, however, known as water sapphire belong to topaz, and are colourless.

Garnets.—Several types of garnet occur in Ceylon. Amongst these are probably—

Cinnamon stone, $Ca_3Al_2(SiO_4)_3$.—Not known *in situ*.

Pyrope, $Mg_3Al_2(SiO_4)_3$.
Almandite, $Fe_3Al_2(SiO_4)_3$.
Spessartite, $Mn_3Al_2(SiO_4)_3$.

} These include the red and pinkish-red garnets so common in and characteristic of the granulites.

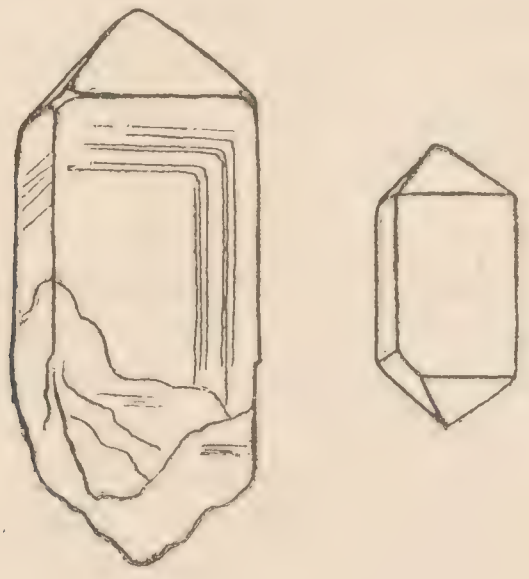

Fig. 6.—Zircon.

Zircon, $ZrSiO_4$.—A very abundant mineral in Ceylon; occurs in the granulites as a microscopic constituent; near Balangoda

occurs abundantly in large idiomorphic crystals in a zircon granite. Common in gem washings, and usually well crystallized. Colour various : brown, yellowish, green. The colourless varieties are known as Matara diamonds ; the coloured as jargoon and hyacinth, used as gems.

Thorite, $ThSiO_4$.

Apatite, $Ca_4(CaF)(PO_4)_3$.—A microscopic constituent of many granulites. Blue apatite is very characteristic of the crystalline limestones.

Fergusonite, $(YErCe)(NbTa)O_4$.

Anhydrite, $CaSO_4$.

Uraninite (*Pitchblende*).—Uranate of lead, the chief source of radium. Not certainly known to occur in Ceylon, as all supposed specimens may be thorianite.

The above forms a complete list of the minerals at present known to occur in Ceylon ; the discovery of others may be expected ; minerals of the samarskite and æschynite groups are probably present.

For further information as to the rocks and minerals the following works may be consulted, amongst others :—

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III.—ROCKS OF SECONDARY ORIGIN.

Of these, **Laterite** (cabook) is perhaps the most important. It commonly occurs overlying quite unaltered granulites, forming a mantle varying from a few feet to many yards in thickness in different places, but is of rather local distribution. When dug it is soft, but as it hardens on exposure it forms a useful building stone. Typical laterite is a decomposition product of the rocks beneath, and is especially characteristic of tropical lands. Laterites are usually found to consist of a fine-grained scaly aggregate of hydrargillite or similar aluminium hydrate, with also ferrous

hydrate varying in amount according to the nature of the parent rock. When the latter contained free quartz, it is found in the laterite in angular grains.

Various **Clays**, including kaolin (China clay), are also found, and are also decomposition products of the granulitic rocks. They differ chiefly from laterite in consisting rather of aluminium silicates than of aluminium hydrate.

Cherts and common-opal rock are sparingly found, often in association with crystalline limestones, and can sometimes be shown to have been formed by pseudo-morphous replacement of the latter; specimens occur containing the phlogopite, graphite, and spinel of the original crystalline limestone, as well as others in which remains of the partially disintegrated carbonates can still be seen.

Travertine (tufa) is a secondary deposit of carbonate of lime (apparently sometimes containing magnesium carbonate as well) removed in solution from the beds of crystalline limestone; but these deposits are but rarely found in large quantity.

IV.—FOSSILS AND RECENT SEDIMENTARY ROCKS.

Even less is known of these than of the crystalline rocks. A belt of raised beach deposits is almost everywhere to be traced around the coast, extending to no great height above sea level. The material composing the deposit varies from a sandstone cemented by calcareous material to a rubbly rock composed entirely of the *débris* of corals and other calcareous organisms.

A series of recent marine fossils from Palanti-aar is exhibited, and includes shells in a calcareous breccia, and well-preserved remains of crabs in nodules of mud. There are also fossil chank shells from the Kadurawala coast; the latter are regularly quarried in the recent deposits of the Jaffna District.

An interesting specimen of a bone and shell breccia from the floor of a Vedda cave is exhibited; but little is known, however, as to the occurrence of really ancient cave deposits; masses of stalactite are rarely found in caves in the crystalline limestones.

In addition to the recent marine sedimentary deposits, there are river gravels and alluviums. Thick beds of the former are of somewhat rare occurrence, but rivers, large or small, are not infrequently bordered by strips of alluvial deposits, and when they leave behind the mountain country, and with it their often torrential character, debouch upon extensive alluvial plains where fine silty muds are still deposited in times of flood. The fine muds thus laid down are of great value in the manufacture of bricks and the coarser kinds of earthenware.

V.—GEMS AND GEMMING.

The gems of Ceylon are of such general interest that it will be worth while to give a brief account of the manner in which they are obtained. With the exception of moonstone and some garnets, none are obtained *in situ*, though all of course are derived from the crystalline rocks where they originally crystallized, like the other minerals accompanying them. It is however popularly and erroneously supposed that they have grown where found, and that small and flawed gems are merely immature.

The gems (of which a tabulated list is given below) are obtained from gravels which have been deposited by streams and rivers; gemming is now only carried on in the Ratnapura District of the

A GEM PIT.

Province of Sabaragamuwa and the Galle District of the Southern Province; but a little is done near Hatton in the Central Province, and a good many gems were formerly obtained near Nuwara Eliya and in the Horton Plains. Many districts are now more or less exhausted. The process of gemming is briefly as follows:— A pit is sunk where gem-bearing deposits of gravels are known to occur; a typical section would show five or six feet of muddy alluvium, resting on a deposit of gem-bearing gravel not more than one or two feet thick, and called the *illam*, below which is the *malawa*, the decomposed (usually kaolinized) country rock, but gravels are of course obtained at various depths, from the actual surface to fifty or sixty feet below. Occasionally two beds of *illam*

are found, separated by a band of clay. However this may be, the *illam* is removed from the pit and subsequently washed in a "gemming basket." This is made of cane, and is of conical form, about 2 feet wide and 1 foot deep, and has a rim about $2\frac{1}{2}$ inches wide. The washer stands in about 2 feet of water, and holding the basket in the water gives it a turning movement, depressing the rim below the water once in every turn, so that the lighter stones are washed over its edge by the centrifugal movement. Fifteen or twenty basketfuls are thus washed, and the residue, consisting only of gems and other heavy minerals, examined. The remaining material, usually thrown away, is called *námbu;* it often contains minerals of scientific interest, and further, it is in this way that the heavy minerals such as thorianite, containing rare elements. are obtained.

Tabular List of Gems found in Ceylon.

Corundum.—Includes sapphire (blue), ruby (red), star sapphire, and star ruby. White sapphires have had their original pale blue or yellow colour discharged by burning. Rubies are almost always burnt in order to discharge in the same way any trace of blue colour. Yellow sapphires are "oriental topaz," and violet coloured ones oriental amethyst. Pinkish-yellow stones are called "king topaz."

Quartz.—Includes rock crystal, amethyst, cairngorm, smoky quartz, &c.

Spinel.—Green, blue, red. The pink and red varieties are called balas ruby; the blue, spinel sapphire.

Chrysoberyl.—Green and yellow; includes cat's-eye and alexandrite.

Topaz.—Colourless, erroneously called water sapphire; rarely yellow; pale sea-green, cut as aquamarine.

Othoclase-Feldspar.—Includes moonstone, quarried from the matrix in the Central Province.

Tourmaline.—Brown and brownish-green and yellow; see zircon.

Beryl.—Pale sea-green, cut as aquamarine (true aquamarine); the true emerald colour is extremely rare in Ceylon.

Cordierite.—Blue, the true water sapphire; rarely seen.

Garnet.—Red, pinkish-red, and brownish-yellow (cinnamon stone).

Zircon.—Green, yellow; the colourless "Matara diamonds" are got by burning pale zircons and so driving off the colour. Most of the material called *toramalli* by gemmers is actually zircon, and not tourmaline.

VI.—ARRANGEMENT OF THE MINERAL GALLERY.

Of the four wall cases, those facing the entrance are devoted to rocks; the two right and left of the door to plumbago, iron ores, mica, kaolin, &c. Of the seven table cases, the five window cases contain the systematic collection of Ceylon minerals, beginning with the elements in the first case on the left-hand, and ending with zircons, &c., in the fifth case on the right. The two central cases contain the recent fossils, and collections of a general character illustrating the geology and mineralogy of Ceylon. Some large and interesting specimens are also accommodated on the floor. Geological photographs and others illustrating the processes of gemming and iron smelting are hung upon the walls. The collection has been arranged and largely added to by the staff of the Mineralogical Survey in 1903 and 1904.

GIANT TORTOISE OF ALDABRA.

(*See page 43.*)